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WATER POLLUTION SURVEILLANCE SYSTEM. VOLUME 8. SOUTHWEST-LOWER MISSISSIPPI RIVER BASIN

Public Health Service
Washington, D. C.

30 September 1963

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SOUTHWEST-LOWER MISSISSIPPI
RIVER BASIN

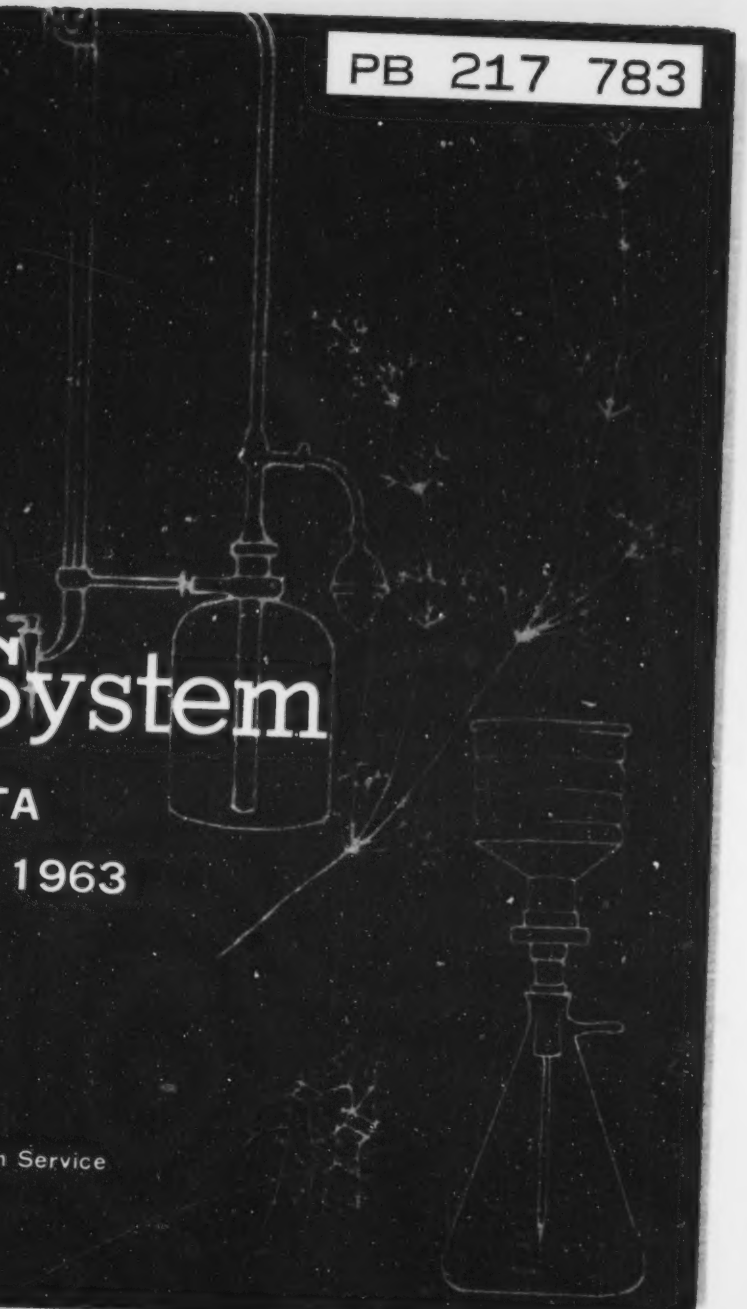
volume 8

PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA

October 1, 1962 • September 30, 1963



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SOUTHWEST-LOWER MISSISSIPPI RIVER BASIN

Volume 8

Public Health Service

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA
October 1, 1962 - - - September 30, 1963

A Federal, State and Local cooperative report on water pollution surveillance of surface waters at selected locations throughout the United States

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Division of Water Supply and Pollution Control
Washington, D.C. 20201

RELATED PUBLICATIONS:

National Water Quality Network
Annual Compilation of Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663 (1958 Edition)

National Water Quality Network
Statistical Summary of Selected Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663—Supplement 1

National Water Quality Network
Annual Compilation of Data, October 1, 1958–September 30, 1959
Public Health Service Publication No. 663 (1959 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1959–September 30, 1960
Public Health Service Publication No. 663 (1960 Edition)

National Water Quality Network
Plankton Population Dynamics, July 1, 1959–June 30, 1961
Public Health Service Publication No. 663—Supplement 2

National Water Quality Network
Annual Compilation of Data, October 1, 1960–September 30, 1961
Public Health Service Publication No. 663 (1961 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1961–September 30, 1962
Public Health Service Publication No. 663 (1962 Edition)

ACKNOWLEDGMENT

To increase the usefulness of the water quality data, annual compilations since 1958, including this one, have presented preliminary and unadjusted flow data for gaging stations at or near most of the Public Health Service Water Pollution Surveillance System sampling points. Final data may be obtained directly from the agency concerned. Any studies using the provisional flow data herein compiled should verify the data prior to completion of reports on such studies. For making the flow information available for this publication, grateful acknowledgment is made by the Public Health Service to:

The International Boundary and Water Commission,
United States and Mexico

The International Joint Commission, United States and Canada

The U.S. Department of the Interior
Bureau of Reclamation • Geological Survey

The U.S. Department of the Army
Corps of Engineers • Lake Survey

FOREWORD

This is the sixth annual compilation of data from the Public Health Service Water Pollution Surveillance System (formerly the National Water Quality Network). During this year, the System was increased from 122 to 128 stations. In order to provide data in a form more useful for local or regional water pollution control officials and their staffs, the present compilation is published in 11 separate volumes. The surveillance data reported herein reveal additional findings on pesticides and other organic chemicals in surface waters and on trends in radioactivity and other areas.

The Public Health Service gratefully acknowledges the assistance to our Surveillance System of the participating local, State and Federal Government agencies and private industry. The success of this program depends, in a large measure, upon their continued interest and support.

GORDON E. MCCALLUM, D. Sc.,
Assistant Surgeon General,
Chief, Division of Water Supply and Pollution Control

VOLUME 1

Northeast Basin

CONNECTICUT RIVER
at Enfield Dam, Conn.
below Northfield, Mass.
at Wilder, Vt.

HUDSON RIVER
below Poughkeepsie, N.Y.

LAKE ERIE
at Buffalo, N.Y.

MERRIMACK RIVER
above Lowell, Mass.

RARITAN RIVER
at Perth Amboy, N.J.

ST. LAWRENCE RIVER
at Massena, N.Y.

VOLUME 2

North Atlantic Basin

DELAWARE RIVER
at Philadelphia, Pa.
at Trenton, N.J.
at Martins Creek, Pa.

POTOMAC RIVER
at Washington, D.C.
at Great Falls, Md.
at Williamsport, Md.

SCHUYLKILL RIVER
at Philadelphia, Pa.

SHENANDOAH RIVER
at Berryville, Va.

SUSQUEHANNA RIVER
at Conowingo, Md.
at Sayre, Pa.

VOLUME 3

Southeast Basin

APALACHICOLA RIVER
at Chattahoochee, Fla.

CHATTAHOOCHEE RIVER
at Columbus, Ga.
at Lanett, Ala.
at Atlanta, Ga.

ESCAMBIA RIVER
at Century, Fla.

ROANOKE RIVER
at John H. Kerr Dam and
Reservoir, Va.

SAVANNAH RIVER
at Port Wentworth, Ga.
at North Augusta, S.C.

TOMBIGBEE RIVER
below Columbus, Miss.

VOLUME 4

Western Great Lakes and Lake Erie Basins

WESTERN GREAT LAKES

DETROIT RIVER
at Detroit, Mich.

LAKE MICHIGAN
at Gary, Ind.
at Milwaukee, Wis.

LAKE SUPERIOR
at Duluth, Minn.

ST. CLAIR RIVER
at Port Huron, Mich.

ST. MARYS RIVER
at Sault Ste. Marie, Mich.

LAKE ERIE BASIN

CUYAHOGA RIVER
at Cleveland, Ohio

MAUMEE RIVER
at Toledo, Ohio

VOLUME 5

Ohio and Tennessee River Basins

OHIO RIVER BASIN

ALLEGHENY RIVER
at Pittsburgh, Pa.

CUMBERLAND RIVER
at Clarksville, Tenn.

KANAWHA RIVER
at Winfield Dam, W. Va.

LITTLE MIAMI RIVER
at Cincinnati, Ohio

MONONGAHELA RIVER
at Pittsburgh, Pa.

OHIO RIVER
at Cairo, Ill.
at Evansville, Ind.
at Louisville, Ky.
at Cincinnati, Ohio
at Huntington, W. Va.
below Addison, Ohio
at Toronto, Ohio

WABASH RIVER
at New Harmony, Ind.

TENNESSEE RIVER BASIN

CLINCH RIVER
above Kingston, Tenn.
at Clinton, Tenn.

TENNESSEE RIVER
at Pickwick Landing, Tenn.
at Bridgeport, Ala.
at Chattanooga, Tenn.
at Lenoir City, Tenn.

VOLUME 6

Upper Mississippi River Basin

ILLINOIS RIVER
near Grafton, Ill.
at Peoria, Ill.

MISSISSIPPI RIVER
at Cape Girardeau, Mo.
at East St. Louis, Ill.
at Burlington, Iowa
at Dubuque, Iowa
at Lock and Dam 3 below St. Paul, Minn.

RAINY RIVER
at Baudette, Minn.
at International Falls, Minn.

RED RIVER (NORTH)
at Grand Forks, N. Dak.

VOLUME 7

Missouri River Basin

BIG HORN RIVER
at Hardin, Mont.

BIG SIOUX RIVER
below Sioux Falls, S. Dak.

KANSAS RIVER
at DeSoto, Kans.

MISSOURI RIVER
at St. Louis, Mo.
at Missouri City, Mo.
at Kansas City, Kans.
at St. Joseph, Mo.
at Omaha, Nebr.
at Yankton, S. Dak.
at Bismarck, N. Dak.
at Williston, N. Dak.

NORTH PLATTE RIVER
above Henry, Nebr.

PLATTE RIVER
above Plattsmouth, Nebr.

SOUTH PLATTE RIVER
at Julesburg, Colo.

YELLOWSTONE RIVER
near Sidney, Mont.

VOLUME 8

Southwest-Lower Mississippi River Basin

ARKANSAS RIVER
at Pendleton Ferry, Ark.
at Little Rock, Ark.
near Forth Smith, Ark.
near Ponca City, Okla.
at Coolidge, Kans.

MISSISSIPPI RIVER
at New Orleans, La.
at Delta, La.
at Vicksburg, Miss.
at West Memphis, Ark.

OUACHITA RIVER
at Bastrop, La.

RED RIVER (SOUTH)
at Alexandria, La.
at Bossier City, La.
at Index, Ark.
at Denison, Tex.

VERDIGRIS RIVER
at Nowata, Okla.

VOLUME 9

Colorado River and Western Gulf Basins

COLORADO RIVER BASIN

ANIMAS RIVER
at Cedar Hill, N. Mex.

COLORADO RIVER
at Yuma, Ariz.
above Parker Dam, Ariz.-Calif.
near Boulder City, Nev.
at Page, Ariz.
at Loma, Colo.

GREEN RIVER
at Dutch John, Utah

SAN JUAN RIVER
at Shiprock, New Mex.

WESTERN GULF BASIN

RIO GRANDE
at Brownsville, Tex.
at Laredo, Tex.
at El Paso, Tex.
below Alamosa, Colo.

SABINE RIVER
near Ruliff, Tex.

VOLUME 10

Pacific Northwest and Alaska Basins

PACIFIC NORTHWEST

CLEARWATER RIVER
at Lewiston, Idaho

COLUMBIA RIVER
at Clatskanie, Oreg.
at Bonneville, Oreg.
at McNary Dam, Oreg.
at Pasco, Wash.
at Wenatchee, Wash.
at Northport, Wash.

PEND OREILLE RIVER
at Albeni Falls Dam, Idaho

SNAKE RIVER
at Ice Harbor Dam, Wash.
at Wawawai, Wash.
at Payette, Idaho

SPOKANE RIVER
at Post Falls Dam, Idaho

WILLAMETTE RIVER
at Portland, Oreg.

YAKIMA RIVER
at Richland, Wash.

ALASKA BASIN

CHENA RIVER
at Fairbanks, Alaska

SHIP CREEK
at Anchorage, Alaska

VOLUME 11
California and the Great Basins

CALIFORNIA BASIN

KLAMATH RIVER
near Keno, Oreg.

SACRAMENTO RIVER
at Greens Landing above Courtland, Calif.

SAN JOAQUIN RIVER
near Vernalis, Calif.

GREAT BASIN

BEAR RIVER
above Preston, Idaho

TRUCKEE RIVER
at Calif.-Nev. Border
at Farad, Calif.

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ANALYTICAL AND FLOW DATA INDEX

STATION	General Description Trace Elements, Strontium 90	Radioactivity Determinations	Plankton Populations	Organic Chemicals	Chemical, Physical and Bacteriological Analyses	Flow Data
	Page No.	Page No.	Page No.	Page No.	Page No.	Page No.
Arkansas River						
at Pendleton Ferry, Ark	25–26	27	28–29	—	30	31
at Little Rock, Ark	33–34	35	36–37	38	39	40
near Fort Smith, Ark	41–42	43	44–45	—	46	47
near Ponca City, Okla	49–50	51	52–53	—	54–55	56
at Coolidge, Kans	57–58	59–60	62–63	61	64–65	66
Mississippi River						
at New Orleans, La	67–68	69	70–71	72	73–74	75
at Delta, La	77–78	79	80–81	82	83	84
at Vicksburg, Miss	85–86	87	88–89	90	91–92	93
at West Memphis, Ark	95–96	97	98–99	100	101–102	103
Ouachita River						
at Bastrop, La	105–106	107	108–109	—	110–111	112
Red River (South)						
at Alexandria, La	113–114	115	116–117	118	119–120	121
at Bossier City, La	123–124	125	126–127	—	128	129
at Index, Ark	131–132	133	134–135	—	136	137
at Denison, Tex	139–140	141	142–143	144	145–146	147
Verdigris River						
at Nowata, Okla	149–150	151	152–153	154	155–156	157

Dash (—) indicates no determination made.

THE PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

The Public Health Service program for providing fundamental information on the quality of the Nation's waters stems from Public Law 660, approved July 9, 1956, as amended by Public Law 87-88, July 20, 1961. Section 4(c) thereof states: ". . . the Secretary (of Health, Education, and Welfare) shall in cooperation with other Federal, State, and local agencies having related responsibilities, collect and disseminate basic data on chemical, physical, and biological water quality insofar as such data or other information relate to water pollution and the prevention and control thereof."

To fulfill this responsibility, the Public Health Service Water Pollution Surveillance System collects, interprets, and disseminates:

a. Information on changes in water quality at key points in river systems, as such quality may be affected by changes in water use and development.

b. Continuous information on the nature and extent of pollutants affecting water quality.

c. Data which will be useful in the development of comprehensive water resources programs.

d. Data which will assist State, interstate, and other agencies in their water pollution control programs, and in the selection of sites for legitimate water uses.

Some 50 sampling stations were established when the program started, October 1, 1957. By September 30, 1963, the number had grown to 128.

Each sampling location satisfies one or more of the following criteria:

a. Major waterways used for public water supply, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

b. Interstate, coastal, and international boundary waters.

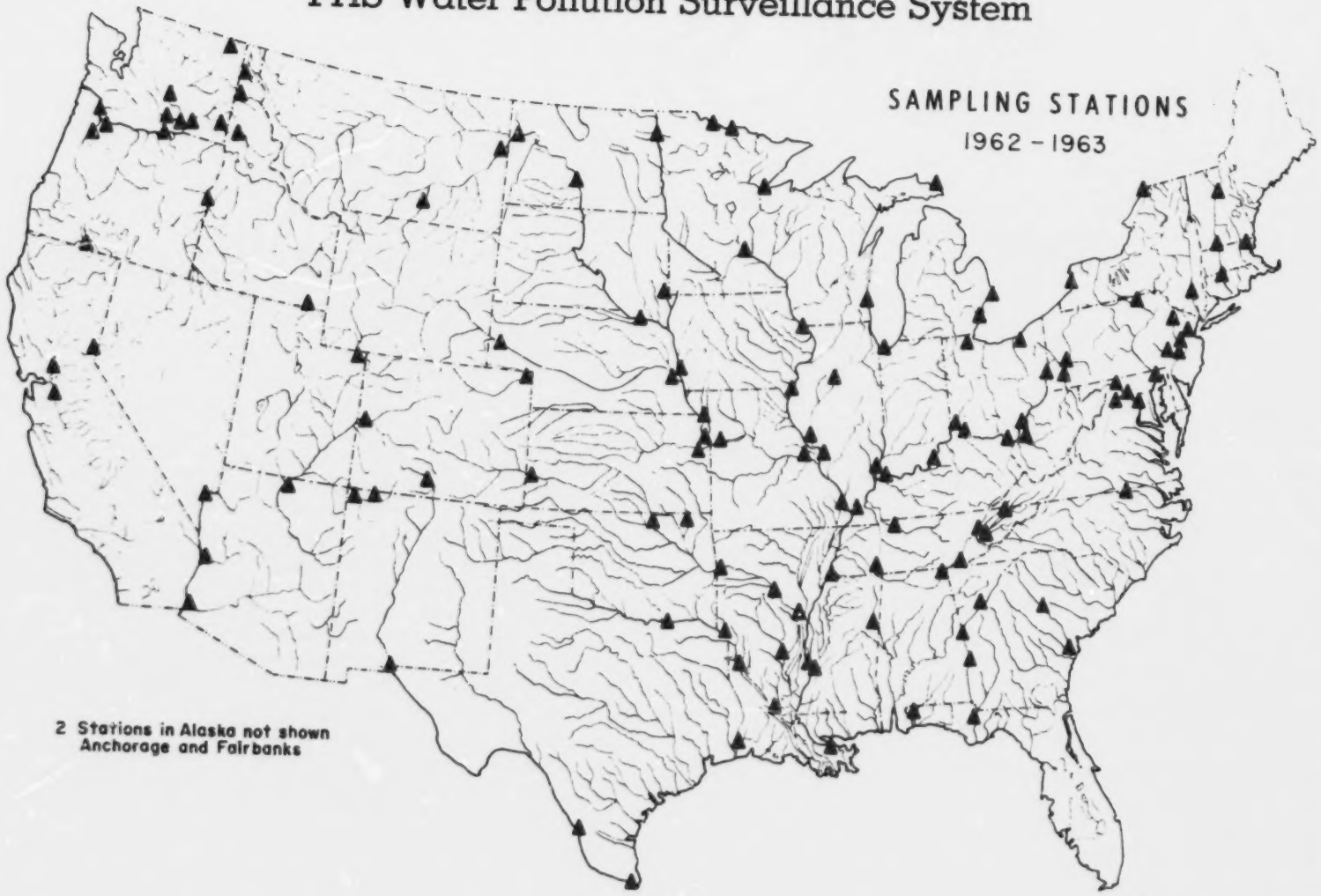
c. Waters on which activities of the Federal Government may have an impact.

Sampling station sites are fixed only after consultation with local, State, Federal and other agencies having related interests.

Active local participation is important in this operation. It assures maximum development of all information valuable both locally and nationally. Program costs are shared by the Federal Government and State and local agencies, those of the latter through contributions of laboratory and sampling manpower. Specifically, the State and local agencies perform certain of the conventional chemical analyses and collect samples for the newer, more complex examinations. The Public Health Service, in turn, performs the more complex determinations and makes the results available to the participants and to the public. In addition, the consultation, training facilities, and other resources of the Public Health Service are available to the cooperating agencies.

Locations of sampling stations in operation as of September 30, 1963, are shown on page 2. Descriptions of the stations, participating agencies, and other pertinent information are presented with the station data.

PHS Water Pollution Surveillance System



MAJOR RIVER BASINS OF THE UNITED STATES

1962-1963

01 NORTHEAST
02 NORTH ATLANTIC
03 SOUTHEAST
04 TENNESSEE RIVER
05 OHIO RIVER
06 LAKE ERIE
07 UPPER MISSISSIPPI
08 WESTERN GREAT LAKES
09 MISSOURI RIVER

10 SOUTHWEST—LOWER MISS.
11 COLORADO RIVER

12 WESTERN GULF
13 PACIFIC NORTHWEST
14 CALIFORNIA
15 GREAT BASIN

Only after careful screening of needs in water resource development was a pattern set for analyses of water samples.
All System samples are examined for:

a. Radioactivity.
   (1) Gross alpha.
   (2) Gross beta.
   (3) Strontium 90.
b. Plankton populations.
c. Coliform organisms.
d. Organic chemicals.
e. Biochemical, chemical, and physical measurements, including biochemical oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), chlorine demand, ammonia nitrogen, hydrogen ion concentration (pH), color turbidity, temperature, alkalinity, hardness, chloride, sulfate, phosphates and total dissolved solids.
f. Sodium, potassium, fluoride and trace elements.

Samples for groups c and e were collected and analyzed weekly. Samples for organic chemicals were collected and analyzed monthly and plankton organism examinations were conducted semimonthly. Water samples for analysis of suspended and dissolved gross alpha and beta radioactivity were submitted weekly. Strontium 90 analyses were made on composites of weekly samples accumulated over 3-month periods. Sodium, potassium, fluoride, and trace metals were also determined on 3-month composites of weekly samples. New parameters which are developed and found significant will be included as the program continues.

Analytical Methods and Reliability of Data

The physical, chemical and biochemical data documented in this publication are the result of efforts of the cooperating agencies. In general, about half of these measurements were contributed by their laboratories. Specifically, all measurements reported for temperature, pH, DO, BOD, COD, chlorine demand and ammonia nitrogen were performed by the participants at the sample collection point. In addition, about 45 of the participating groups regularly perform all or most of the determinations for the remaining parameters included in the data. Whenever possible, analyses for stable constituents not completed by the participants are completed in the central Water Quality laboratories. While individual laboratories make minor modifications to meet local conditions, the methods used in most cases are those published in the 11th edition, "Standard Methods for the Examination of Water and Wastewater" (22). For uniformity, the chlorine demand test is reported on the basis of the starch-iodide titration procedure, and the chemical oxygen demand test is restricted to the use of 0.025 N reagents.

To assure continued reliability in the published data, frequent analysis of reference samples are made by each cooperating laboratory as an integral part of the overall program. Periodically a synthetic standard sample is provided to each participant for reference analysis. The reported results are reviewed. Any significant errors are called to the attention of the reporting laboratory and, after the cause of the errors has been determined, the previously submitted data are either corrected or discarded. From these findings, the analyses reported in this compilation are believed to be accurate to ± 10 percent of the reported values.

The analytical methods used by the Public Health Service laboratories are described in the discussion of water quality parameters which follows, and are covered by references listed in the Bibliography.

Water Pollution Parameters

In the assessment of water pollution, all of the legitimate purposes for which raw waters can be used, and which may be affected by pollution, must be considered. These may range from the minimum requirements for navigation to the ultimate in water quality demanded for certain industrial processing. Standards differ considerably, therefore, according to water use.

For domestic use, water must be free of disease organisms, clear, colorless, taste- and odor-free, and have a relatively low dissolved mineral content. Agricultural water is judged primarily on its mineral content, especially with respect to the ratio of sodium to other cations, and the presence of boron. Water for fish propogation and recreational purposes must be relatively free from domestic and industrial pollution and must be able to sustain an active flora of the smaller aquatic organisms on which fish and wildlife feed. Industrial water quality demands run the gamut from the complete absence of minerals to a requirement of low temperature, the critical factor in water used for cooling. The effects of radioactive materials on these uses have not yet been fully appraised.

The various laboratory examinations made as part of this program are discussed below.

Radioactivity

Radioactivity, long recognized as a water contaminant from natural sources, has continued to grow in importance and health significance with the development of nuclear energy for both military and peaceful uses. Consequently, levels must be measured continually as new sources are established.

Gross alpha and beta measurements are made on both suspended and dissolved solids in the raw surface water samples. The total radioactivity in the dissolved solids provides a rough measure of the levels which may be found in a treated water, where water treatment removes substantially all of the suspended matter.

Beta activity levels generally reflect the variable contamination resulting from fallout and discharges from nuclear energy installations, institutions utilizing radioactive materials, and other manmade sources. The trend of gross beta radioactivity in samples received from 47 of the Public Health Service Water Pollution Surveillance System stations operating since 1957 is presented in Figure 1. During the first three quarters of the 1962 water year, renewed weapons testing resulted in a rise in gross beta radioactivity in surface waters of the United States. During the sec-

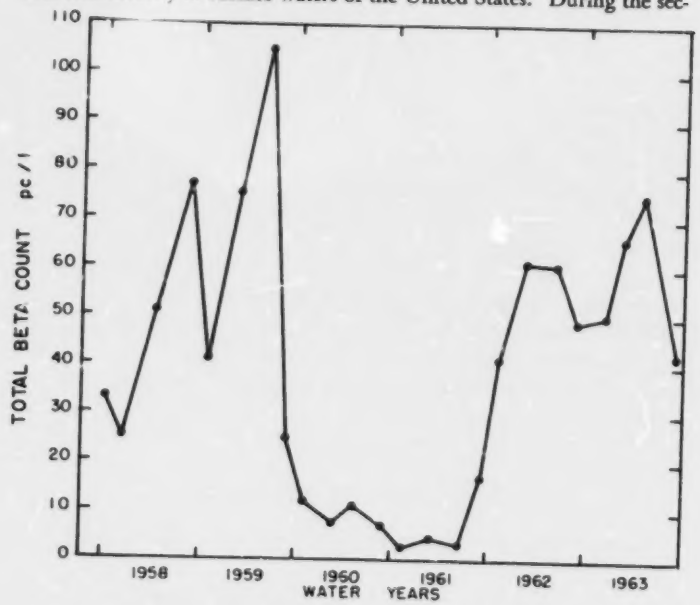


FIGURE 1. GROSS BETA RADIOACTIVITY IN THE SURFACE WATERS OF THE UNITED STATES.

ond and third quarter of water year 1963, the national average activity reached a maximum of 75 pico curies per liter and then decreased. Beta levels have remained well below the Public Health Service Drinking Water Standard of 1,000 pc/l or $\mu\mu c/l$ (26).

Alpha levels reflect largely the activity added by uranium and thorium daughters. The waters of the United States can be characterized in a general way with respect to gross alpha radioactivity content. Gross alpha levels average less than 1 pc/l in east coast, Appalachian, Great Lakes, and Pacific Northwest States. On the Colorado Plateau, and along the eastern slope of the Rocky Mountains, natural radioactivity, principally from mineral deposits, results in average concentrations of about 20 pc/l.

Gross levels are most informative in ascertaining long-term trends or changes in water quality. By themselves, however, they are of limited value in assessing radiation exposure. Where gross results are consistently over the maximum permissible concentrations for mixed fission products, the identity of the specific radionuclides involved must be established.

Because of its significance in the environment, the concentration of strontium 90 in the total solids is also reported. In water year 1963, strontium 90 levels ranged from 0.4 to 11.3 pc/l. The national average reached a high of 3.8 pc/l during the fourth quarter (July, August, September 1963). Highest levels were in the north-central area of the coterminous United States where the average was approximately 6 pc/l for this quarter. All averages were less than the limit (10 pc/l) specified in the Public Health Service Drinking Water Standards (26). The levels of strontium 90 activity in waters of the United States since the first quarter of the 1959 calendar year are presented graphically in figure 2.

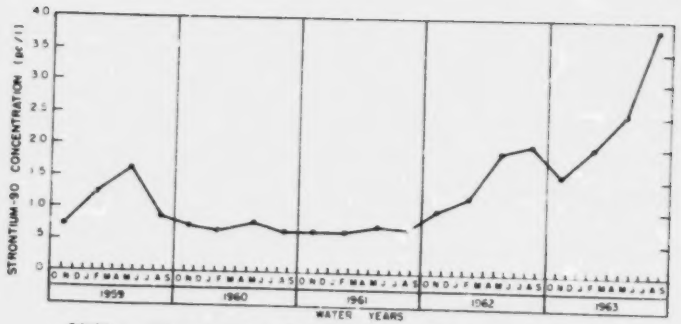


FIGURE 2 STRONTIUM-90 IN SURFACE WATER OF THE UNITED STATES

Plankton Populations

Geographical distribution of algae and other planktonic organisms are influenced by geologic and climatic factors, and result in distinctive plankton populations in different areas. Within each region, population changes are directly related to temperature, and the nature and concentration of organic and mineral substances which enter the aquatic environment. These substances may come from domestic sewage, industrial wastes, runoff from agricultural lands, irrigation discharges, or native rocks and soils. They may be basic nutrients, highly toxic, or metabolically inert. Planktonic organisms differ greatly in their sensitivity to the nutrient and toxic substances which are present. Some thrive only in water which is relatively free of nutrients while others multiply rapidly in water which has been greatly enriched. Large numbers of tolerant algae usually develop in waters containing abundant supplies of inorganic nitrogen and phosphorus resulting from the mineralization of domestic sewage. These nuisance populations may clog filters in municipal water plants, and produce objectional tastes and odors.

On the other hand, plankton populations may be eradicated by the introduction of toxic organic or mineral wastes. This is not desirable because some plankton organisms play essential roles in providing food and oxygen for higher forms of aquatic life, and in cleansing polluted waters.

Beginning at low nutrient levels, progressive enrichment of waters results in an increase in the variety and abundance of the plankton. However, as higher levels of enrichment are attained, the increase in total numbers of organisms is accompanied by a decrease in the number of kinds of organisms. This change is typical in populations which have been subjected to the wide spectrum of substances being introduced into

surface water in ever increasing amounts. Plankton counts, which provide information concerning the variety and abundance of organisms, are useful in detecting changes in the concentration of organic and mineral substances which enter water supplies.

METHODS OF ANALYSIS

Plankton samples are collected semimonthly at each station. A sample consists of 3 liters of raw water taken directly from the stream or from a treatment plant intake. Preservation is effected at the time of collection by the use of 30 ppm merthiolate.

Three types of analyses are performed:

1. Rotifers, crustacea, and other micro invertebrates are removed from a 1-liter aliquot of the sample by settling 24 hours. The sediment is placed in a special slide, 80 x 50 x 2 mm., and the organisms are enumerated under a compound microscope at 100× magnification. The counts are reported as organisms per liter.

2. A "total live algae" count is obtained from 1 milliliter of the sample by scanning two 50-mm. strips on a Sedgwick-Rafter slide using 200× magnification and a Whipple micrometer disc. An appropriate correction factor is used to convert the counts to units per milliliter. Each single cell or natural aggregate of cells (colony) occupying up to 300 square microns (μ^2) is counted as 1 unit. Large colonies are enumerated according to a modified areal-unit method in which aggregates occupying 300–1,000μ^2 are counted as 2 units, those occupying 1,000–2,500μ^2 as 3 units, those 2500–5000μ^2 as 4 units, and those over 5,000μ^2 as 5 units. About 95 percent of cell aggregates fall into size 1 or 2.

3. Identification and proportional census of diatom species are done from sediment obtained by settling 1 liter of the sample 48 hours. A small aliquot of the sediment is placed on a No. 1 coverglass and dried on a warming table. The sediment is ashed on the coverglass by heating on a hotplate, and permanent slides are made with hyrax mounting medium. Counts are made with 90× apochromatic oil immersion objectives and 10× oculars containing a Whipple micrometer disc. Random strip counts are made until the total number of units reaches 200 to 300. The same areal units are used as described for Sedgwick-Rafter counting.

Organic Chemicals

The Nation's water resources continue to receive increasing quantities of organic contaminants. Since 1940 the chemical industry, particularly in the manufacture of synthetic and petrochemicals, has experienced an enormous expansion that shows every sign of continuing. Each year millions of pounds of synthetic detergents, insecticides, herbicides, and similar domestic products find their way into our streams from household sewers, industrial waste discharges, and land runoff.

Effective and economical treatment methods for most of the complex organic materials remain to be developed. Even where treatment exists, residues may remain in sufficient quantity to cause water damage. These stable residues persist through sewage treatment, biological and chemical action of the stream, and water treatment processes, and finally reach the consumer in drinking water.

The presence of some of these materials, even at concentrations considerably less than 1 part per million, may impair water quality, most noticably in production of tastes and odors. Fishflesh tainting, also quickly noticed by the consumer, is another damage. Effects on water treatment, many of which are ill-defined at present, and impairment of water quality for industrial uses are being reported with increasing frequency. Essentially nothing is known of the possible immediate or long-term effects of these materials on human health. Such information is urgently needed.

The usual sanitary analyses are not effective in measuring these newer organic contaminants. Yet it is essential to know something of their concentrations and character. A method known as the "Carbon Adsorption Technique," developed by the Public Health Service, permits the concentration of these organic compounds from a large volume of water. Elution of the adsorbed materials with organic solvents, followed by chemical separation and testing, provides useful information concerning organic pollution and for assaying river systems for these substances.

Following continuous flow of about 5,000 gallons of water through the carbon adsorption column over a 7- to 10-day period at 0.5 gpm, material on the carbon adsorption column is extracted with two solvents chloroform and alcohol. The residues are weighed. The concentration of these materials in the water sampled is then computed. See Explanation of Analytical Data, page 21.

CHLOROFORM EXTRACTS

The organic residue recovered from the carbon adsorption column by chloroform is very complex. It is desirable to separate the crude extract into certain broad chemical classes, and this can be done on the basis of solubility differences. The various classes or groups and their general significance are discussed briefly below.

Ether Insolubles

This group is usually a brown, humuslike powder, apparently composed to a large extent of carboxylic acids, ketones, and alcohols of complicated structure. Origin of the group, which is an indicator of "old" pollution, is believed to be partially oxidized sewage and industrial wastes. For example, the Ohio River at Cincinnati has been exposed to much industrial and sewage pollution, and hence large amounts of ether insoluble materials are found. Streams with little or no pollution history have little or no ether insolubles. Chloroform extracts contain from 0 to 30 percent of ether insoluble material.

Water Solubles

These substances are largely acidic and undistillable at moderate temperatures, but their solubility in ether indicates that the molecules are smaller and probably simpler than the ether-solubles. On the other hand, their water solubility practically requires the presence of several functional groups, such as hydroxy-acid, keto-acid, and keto-alcohol. Such compounds probably originate from partial oxidation of hydrocarbons or they may be natural substances. They have very little odor. These materials usually make up 10 to 20 percent of the total extract.

Weak Acids

This group is characterized by being removed from ether solution with sodium hydroxide but not with sodium bicarbonate. Phenols are the best known weak acids, and if present in the water, appear in this group. Other weakly acidic compounds include certain enols, imides, sulfonamides, and some sulfur compounds. This group of materials also occurs in nature. The weak acids are odorous, and commonly constitute 5 to 20 percent of the chloroform extract.

Strong Acids

These acids are usually carboxylic acids such as acetic, benzoic, salicylic or butyric. Although classified as strong in reference to carbonic acid, they are actually weak when compared with a mineral acid, such as sulfuric. Many of the compounds are used industrially, but may also be produced by natural processes, such as fermentation. Some of the materials are highly odorous. This fraction makes up from 5 to 20 percent of the total. The significance of the strong acids can be interpreted only in the light of stream pollution conditions.

Bases

These compounds are organic amines. Such materials as aniline and pyridine are amines of commerce. Lower amines may occur as a result of decomposition. Although odorous, the low concentrations found are not likely to cause objectionable conditions. However, in the case of specific amine-containing wastes the compounds can be of considerable significance. Generally, only 1 or 2 percent of the total extract is made up of the bases.

Neutrals

This group frequently constitutes the major portion of the chloroform extract. Neither basic nor acidic, the materials are less reactive and tend to persist in streams longer than many other types. Hydrocarbons, aldehydes, ketones, esters, and ethers are examples of neutral materials. The group lends itself to further fractionation by means of chromatographic separation into aliphatic, aromatic, and oxygenated subgroups:

Aliphatics: This portion represents petroleum type hydrocarbons in a considerable state of purity, and is usually made up of mineral oil type of material. The percentage of aliphatics present yields important information about the possible source of pollution, since petroleum is the most likely source.

Aromatics: These are principally the coal tar hydrocarbons such as benzene, toluene, and a host of others, and their presence in any significant amount is a reliable indication of industrial pollution. Further, the materials can frequently be identified by infrared spectrophotometry. Some aromatic compounds which have been found in our rivers—and in our drinking water—include DDT, aldrin, endrin, dieldrin, phyenyl ether, orthonitrochlorobenzene, pyridine, phenol, and others. The materials are highly odorous, and may also be toxic. Their appearance in any quantity as pollutants should receive careful evaluation.

Oxygenated compounds (Oxys): These are the neutral compounds containing oxygen, such as aldehydes, ketones, and esters. They may have originated by direct discharge or may represent oxidation products from both natural and industrial materials. They help to indicate the "age" of the pollution, since pollution exposed to oxidation forces for a long time would be expected to contain large amounts of oxys. The oxy materials are odorous.

Losses

Manipulative losses inherent in this type of separation may amount to 10 to 15 percent. Losses greater than this may indicate that volatile components were lost from the sample. Such volatiles may have significance as pollutants.

ALCOHOL EXTRACTS

The alcohol extractables generally consist of materials more polar than the chloroform extractables. They often contain synthetic detergents, carboxylic acids and humic materials which may originate naturally or from oxidized products of domestic and industrial wastes. These classes of substances are not quantitatively recovered by the alcohol extraction. For example, this extraction recovers only 20 to 30 percent of the synthetic detergents present. On waters of mixed industrial and domestic pollution, the chloroform and alcohol extractables may be about equal. On some streams where the industrial pollution is rather low and much natural pollution or sewage is present, the alcohol extractables may exceed the chloroform extractables by a factor of 4 to 6.

The alcohol extract is usually only partially soluble in water and most ordinary solvents. Very little further chemical separation of this material is currently practical. However, tests have revealed that synthetic detergents may make up 1 to 12 percent of the alcohol extract.

OTHER TESTS

Infrared spectra are routinely run on the total chloroform and alcohol extracts as well as the neutral, aliphatic, aromatic and oxygenated groups which are usually the most significant. Spectra of other groups are obtained when there is an indication that they may be significant. These spectra reveal something of the chemical structure of the materials, indicate differences and in certain instances provide a definite identification. In the case of the alcohol extracts, the infrared spectra will indicate the presence of synthetic detergents if the materials constitute a significant portion.

Thin layer chromatography has been applied successfully to the resolution of the aromatic and basic fractions of CCE. Gas chromatographic equipment with flame ionization, electron-capture and microcoulometric detectors have also been used freely in the identification of specific substances.

COMPOSITE ANALYSIS

Samples from certain locations have been selected for analysis on a quarterly composite basis. Stations that have collected at least 12 samples in a nearly consecutive manner and averaged 100 ppb. or less of chloroform extractables are selected for such analysis when certain other conditions are met. However, samples falling in this category are analyzed individually when the recovery of the chloroform extract is exceptionally high and/or it is unusual in its infrared spectrum or some other physical characteristic.

SPECIFIC IDENTIFICATIONS

Information about specific organic substances which were identified in carbon adsorption samples is given on the second page of the group associated with each station. The increased number of pesticide and other specific compounds identified, as compared to previous years, is partly associated with greater sensitivity in analytical methodology and may be partly a reflection of the increasing usage of these substances in the total environment.

Chemical, Physical, and Bacteriological Examinations

The various biochemical, chemical, physical, and bacteriological examinations generally performed by the participating laboratories are discussed below.

AMMONIA NITROGEN AND CHLORINE DEMAND

The cost of water treatment for domestic use is affected by the consumption of chlorine, with ammonia nitrogen being responsible for a large portion of the chlorine demand. The greater this demand, the more expensive is the treatment. The ammonia may originate from unstabilized domestic pollution, from industrial waste discharges, from run-off containing fertilizers used in farming operations or from all three. The presence of measurable quantities of nitrogen compounds, not necessarily ammonia, is also an indication of the fertility of the stream toward both macro- and micro-biological forms.

COLOR

Color in domestic water supplies is undesirable. Its removal in the water treatment process, whether it be from natural or industrial sources, may require large doses of chemicals and be expensive.

DISSOLVED OXYGEN, BIOCHEMICAL AND CHEMICAL OXYGEN DEMANDS

Biochemical processes, in which aquatic organisms attack and stabilize the organic matter present, require dissolved oxygen. If unstable oxidizable organic matter is present in excess, the organisms will multiply rapidly, consuming the oxygen present in the water, and bring about a foul, septic stream condition. The dissolved oxygen level thus serves to indicate the biochemical activity of the stream. High activity, resulting in low dissolved oxygen levels, will drive out game fish in favor of scavengers. Very low or zero oxygen levels will kill all fish and aquatic organisms dependent on dissolved oxygen for life. Temperature and reaeration rates also affect dissolved oxygen levels.

The 5-day biochemical oxygen demand (BOD) indicates the degree of unstabilized organic pollution from either domestic or industrial sources, to which the stream is being subjected. A significant demand will affect the fish and macroorganism population, and waters carrying a high BOD seldom contain game fish. On the other hand, game fish will thrive in streams in which the oxygen demand has been stabilized, as this condition is usually favorable for the growth of organisms on which fish feed.

The chemical oxygen demand analysis serves to support the findings of the biochemical oxygen demand test. It too may indicate to what extent the waste load of the stream has been stabilized, or it may indicate the presence of organic and inorganic pollution which is not readily oxidized by biological processes. Because the chemical oxygen demand can be determined quickly in comparison to the biochemical oxygen demand, the establishment of a correlation between the two parameters serves to reduce the number of the latter determinations required. The chemical demand results are nearly always higher than the biochemical demand.

TEMPERATURE

Temperature is particularly important to conservation and industry. A few degrees elevation in temperature due to cooling water discharges may seriously limit the capacity of a stream to support fish life. Also, high water temperatures increase the cost of cooling water for

industrial operations. Cooling towers and other equipment for handling cooling water must be engineered to the temperature levels normally encountered.

MINERAL CONSTITUENTS

These determinations include alkalinity, hydrogen-ion concentrations (pH), hardness, chlorides, sulfates, and total dissolved solids. The pH indicates whether water is acidic or alkaline, corrosive or passive. Alkalinity is a measure of the neutralization reserve present, or the extent to which the water can resist a change from an alkaline to an acid condition upon addition of acidic chemicals. This information is important to the water treatment plant operator and to many other water users.

Hardness is not only a measure of the soap consuming property, but is also of importance in the treatment of boiler waters, where removal of hardness is one of the most important functions. Chloride, sulfate, and total dissolved solids add further information on the gross dissolved mineral content carried by the stream. These are of great importance when considering the taste or palatability of water. They are also important when the water is being demineralized for specific industrial processes, since the cost of demineralization is a direct function of the dissolved solids content of the water. In addition, waters of high saline content are less desirable and may at times even be unfit for municipal, irrigation, and other uses.

TURBIDITY

Turbidity of water is due to the suspension of clay, silt, finely divided organic matter, microscopic organisms, and other similar materials. Its presence is of particular importance in water treatment processes and in the propagation of fish and other aquatic life.

COLIFORM ORGANISMS

Information about fecal pollution is essential to water quality measurements. Data on coliform bacteria, used as indicators of pollution, help to point up the trends in the effectiveness of treatment of domestic waste discharges.

The delayed-incubation membrane filter technique is used for the coliform examination, instead of the fermentation tube (MPN) method. The latter necessitates transport of water samples to the Water Quality Section laboratory for examination, with a time lapse between collection and examination that can significantly change their microbial content. Also, some of the many other bacteria present in raw water might overgrow or otherwise inhibit the demonstration of the coliform organisms. In the delayed-incubation membrane filter procedure, the bacteria are filtered out from the fluid samples immediately after collection and the filters sent to the Water Quality Section laboratory on a preservative medium. In the laboratory the membrane filters carrying the bacteria are transferred to a medium selective for coliform organisms, then incubated and counted. The resulting counts approach very closely the actual numbers of coliform bacteria present in the water samples at the time of collection.

Unusual populations of coliform bacteria may mean increased pollution and ensuing loss of water quality. The Public Health Service Water Pollution Surveillance System studies and reports the trends in sewage pollution on streams as indicated by the trends of coliform counts.

Trace Elements and Other Determinations

This year's trace element data differ somewhat from data reported in previous compilations in that the manner of obtaining the data has been modified and the program of elements measured altered. The trace metals measurements are now obtained from a 3.4 meter direct reading spectrograph. Tin, antimony, and bismuth have been discontinued; arsenic, boron, phosphorus, aluminum, and strontium have been added. Increased sensitivity for several elements has been attained, especially zinc, manganese, and beryllium, resulting in fewer indeterminate values.

Twice during the year, 3-month composites of the weekly samples were prepared and subjected to analysis. Examinations covered those elements included in the Public Health Service Drinking Water Standards (*26*), and other metals considered to have possible physiological or

toxicological significance. The ultimate goal of this phase of the program is to provide background data on all elements which may be found in water and which may be of significance in water quality management.

In carrying out the spectrographic examination, the sample is first passed through a membrane filter, .045 micron pore size, to remove all suspended matter. An aliquot of sample is then acidified with redistilled nitric acid and evaporated to a concentration containing 100 mg. of dissolved solids in 5.0 ml. A portion of the prepared sample is placed in a porcelain boat and sparked using a rotating disc, with concentrations of the 19 programed elements measured on the direct reader (*12*).

Waters of low dissolved solids content can be concentrated to a greater degree than those having a high dissolved solids content, thus accounting for the variable sensitivity shown in the tabulations. Values followed by an asterisk (*) show the limits of sensitivity at which the test was performed and indicate that the ion being measured was not detected at that level.

It is known that trace concentrations of some ions are subject to precipitation and adsorption on container surfaces during storage. This applies particularly to iron and manganese which are subject to oxidation. Hence, all the values reported by the spectrographic method represent the quantity of metal in solution at the time of analysis to within about 10 percent.

The measurement of sodium and potassium is performed using a flame procedure. Fluoride is determined with the SPADNS reagent using the method described by Bellack and Schouboe (*3*). Boron, previously measured by the curcumin procedure, is now reported from the spectrograph. Measurement of selenium has been eliminated due to the general absence of this element from the samples examined.

The concentrations of surface active agents, reported as alkyl benzene sulfonate (ABS), in the Nation's surface waters is reported for the first time on a number of selected stations. As the capability of determining this pollutant increases, efforts will be made to include all sampling points in the Surveillance System. The data presented here were obtained using a modification of the Standard Methods methylene blue procedure on an automatic analyzer.

The Benthos

Animals and plants that live in or on the bottom substrata of lakes and streams are known as the benthos. This biological community includes such common animals as immature insects, worms, clams, snails, and crustacea. The benthic populations found on a stream bottom are largely determined by the type of substrate. Bottoms consisting of soft silty sediments are normally inhabited by animals that are able to burrow into the sediments and feed on organic detritus in the sediments. These include worms, clams, and certain insect larvae. The number of species is usually small in these habitats. Shallow streams with shoals, rapids, and riffles have more available niches for animals to occupy and the normal benthic fauna usually includes a large variety of organisms.

The benthic populations provide a basic indicator of general water quality. Whereas the plankton organisms move downstream with the current, and fish are able to migrate considerable distances, the benthos is a population relatively fixed on the bottom and the animals are subject to the water flowing over them. The benthic populations will therefore be influenced by the quality of the water.

The animals that make up the benthos have various life cycles. Insects may exist as aquatic larvae living in the bottom for as long as 2 years. They then emerge as adults and mate. The female deposits fertilized eggs into the stream. Some of the class produce young which attach themselves to fish. Some of the worms reproduce asexually. An analysis of the age structure of certain forms in the benthos may provide information on past conditions of the water.

Under conditions of good water quality the benthos should include a variety of species with no one species being present in excessive numbers. If the water should become degraded, certain species in the population, intolerant of the changed environment, will die out; and as the water quality deteriorates, increased numbers of species in the benthos will be eliminated. The one or more species that survive may be able to develop very large populations. Toxic materials in the water or deposited on the bottom may effectively eliminate all bottom life.

At each station where bottom samples are taken an attempt is made to find areas of suitable substrate. From these areas, where pos-

sible, a series of at least six quantitative samples is taken by means of suitable dredges or samplers. In riffles the Surber squarefoot sampler is used. In deep rivers the Ekman or Peterson dredge is used (see Standard Methods, for the Examination of Water and Wastewater, 11th edition, pp. 572–582) (22). A general qualitative collection of invertebrate life is usually made at all stations.

The bottom materials are screened in the field using a screen with 28 meshes to the inch. The concentrated sample is preserved in alcohol and returned to the laboratory.

In the laboratory the sample is transferred to pans and the macroscopic organisms are separated from the sediment and detritus. The animals are then identified as near to species as possible, enumerated, and weighed. Specimens are preserved and retained for future reference.

During this year benthos data were gathered for stations in the Ohio and Tennessee River basins only and are presented with the descriptive material for the appropriate stations. A supplemental analysis of these data will be published separately.

Fish Populations

Fish are a biological end product of the aquatic environment. They are an important source of food, and sport fishing is one of our leading forms of recreation. The maintenance of fish life has been recognized by the Congress, and by States which have protective pollution control legislation, as an important and legitimate use of our Nation's waterways. In other words, in measuring fish populations at Surveillance System stations, we are not measuring a parameter that affects a water use as in the case of other measurements presented in this compilation, but rather a unique parameter that is in itself considered a beneficial water use.

The water quality requirements and tolerance of aquatic life to different types of contaminants vary tremendously. It is this variability in response which makes living aquatic organisms usable indicators of environmental disturbance. Fish require water relatively high in dissolved oxygen, and are intolerant of many chemical and physical contaminants resulting from agricultural, industrial and mining practices. However, the tolerance of different species varies, and man-induced changes of the environment often affect one species more than another, producing imbalanced populations which quite often favor the species less desirable economically.

Moderate amounts of putrescible wastes may enrich the habitat, resulting in great increases in standing crops of fish present. However, under such conditions, the more tolerant and adaptable species may comprise a disproportionate share of the total population, and very sensitive species may be eliminated altogether. The effect of toxic wastes may vary from complete elimination of populations to a reduction in reproductive capacity, growth and resistance to disease and parasitism.

Fish kills are a spectacular and obvious indication that an abrupt change has taken place in the environment. However, because of high mobility resulting in rapid recruitment, the fish population in a river or stream may return to normal levels within a very short time after a kill.

Chronic pollution, to which the fish population must adjust over a period of time, will be reflected in the kinds and relative abundance of the fish species present. In addition to the species composition, the condition of the fish, their growth, reproductive success and certainly their palatability are factors of considerable importance in evaluating the suitability of a body of water for supporting usable stocks of fish.

During the current water year, data on fish populations were gathered for some stations in the Ohio and Tennessee River basins only, and are presented in tables in volume 5 for the appropriate stations.

Fish samples at these stations were collected primarily with rotenone and with an electrofishing device. Five percent emulsified rotenone was applied at suitable sites, where an area of 1 to 3 acres could be blocked off with nets during the rotenoning operation. Such sites were usually in the form of small coves along the shoreline, the mouths of small tributaries, or behind the partial enclosure created by navigational lock walls. An electrical shocking device was used along the shoreline both during the day and at night. In a few cases, samples were also collected with trammel nets and with short, 25-foot haul seines. Sampling with nets and seines was limited because of the paucity of habitat in large rivers which is suitable for using these types of gear.

With each method used sufficient sampling was done to collect as many species present as possible, and to obtain a measure of the relative abundance and size distribution of the various species. Every type of fishing gear is somewhat selective, and the data obtained may not be representative of the actual population composition present in the river at the time of sampling. However, the data obtained by a given method are quantitatively comparable and may be used to evaluate changes in the population composition resulting from natural and man-induced changes in the habitat. Comparisons should be based on samples collected with the same gear, during the same season of the year, and under similar conditions of stream flow and water temperature. These data will be particularly useful in determining the impact of changes in water quality on the fish populations of the Nation's rivers over long periods of time.

For convenience of comparison, the fish in the tables are grouped into six major categories based on food habits and methods of feeding:

I. Large, sight feeding carnivores that feed on other fish. This group includes most game species.

II. Species that feed primarily on insects. This group provides important forage for species in group I.

III. Species that feed primarily on plankton and algae. These also provide important forage for group I species.

IV. Species that feed primarily on mollusks.

V. Omnivores that feed indiscriminately on plant and animal matter from the bottom.

VI. Scavengers that take any available food. Some of the species in this group may sometimes act as predators. The group also includes many important food fish, and species that are tolerant of degraded conditions.

Because foods and feeding habits vary with size, age, and availability of food, there may be considerable overlap between groups. The species listed were grouped according to available literature regarding the main foods of adult specimens of each species.

In the field the total length of the fish was routinely measured to the nearest inch class on a one-half inch interval. Thus a fish in the 5-inch class would measure from 4.5 inches to slightly under 5.5 inches. If the end of the tail touched the dividing line between two length classes, the fish was included in the higher classification. The percent total number and weight are carried to the nearest one-tenth of 1 percent in the tables. The one-tenth of 1 percent was arbitrarily selected for purposes of tabulation, and does not imply such a high level of sampling accuracy.

The fish are listed by common names in the tables according to American Fisheries Society Special Publication No. 2 (1960), A List of the Common and Scientific Names of Fishes From the United States and Canada, Second edition (*1*).

Stream Flow

Stream flow data have a most important role in the utilization of water quality parameters such as are included in this report. For this reason, average daily flow records are reported for most of the sampling stations in the System.

All flow data included in this compilation are *provisional* data furnished by the agencies credited, and are subject to revision by such agencies prior to any final publication. With the exceptions mentioned, the flows are given as furnished to the Public Health Service.

The data were generally furnished in units of cubic feet per second. In general only the first three digits were considered significant. Because of machine limitations the data are reported here in thousand cubic feet per second. Even though three zeros may appear after the decimal, no artificial accuracy of measurement is implied. Only the first three digits should be considered significant. There are two exceptions:

(1) When the flow was over 1 million cubic feet per second, the first four digits are reported, and (2) at times when the Rio Grande flows were extremely low, the data were reported to tenths of a cubic foot per second. These figures are published showing 4 decimal places.

Flow data for sampling stations on the rivers of the Great Lakes system are reported as the monthly mean flow, as computed by the U.S. Lake Survey. In certain other rivers, flow data were computed by the Public Health Service from information supplied by the gaging agency. The methods of computations are shown as footnotes to the data for the applicable stations.

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Explanation of Analytical Data

RADIOACTIVITY DETERMINATIONS

In evaluating radioactivity data it should be noted that the reported errors represent counting errors only and the reported values are subject to other errors commonly associated with gross radioactivity analysis. (See Reference 22.)

A dash (—) in the count column signifies that no determination was made. An asterisk (*) following date of sample indicates that determinations are for composites of two or more samples taken on and before the date shown.

Strontium 90 determinations are reported in micro-microcuries per liter as measured from total solids in the sample composited for the quarter. A dash (—) indicates that no determination was made in that period.

PLANKTON POPULATION

Plankton data are reported on two pages. The first page lists the population size of various groups of algae. A coded number shows the ten most abundant genera of algae and their count level. Code numbers used are identified on page 18. Blank spaces on the data sheets signify that counts of other genera were below a level of 150 per ml. The second page of plankton data lists the four dominant diatom species and their occurrence as a percent of the total diatom population. The percent of occurrence of all other diatom species is shown in the next column. Identification codes of species are given on page 19.

The detectable numbers per ml. of fungi, sheathed bacteria and protozoa are shown in the next two columns. The rotifer and crustacea totals per liter are listed together with the genera where these occurred at a count level of five or more per liter for rotifers and three or more per liter for crustacea. Nematode and miscellaneous animal form counts per liter appear in the last two columns.

A dash (—) indicates that no analysis was made. A zero count of each group is indicated by "0". Blank spaces under abundance and dominance columns indicate that the populations were too few to be included or were absent. Coding for abundant genera of rotifer and crustacea population levels are presented on page 20.

PLANKTON POPULATION

Identification Codes of Algae Genera and Count Levels of Most Abundant Genera

KEY TO COUNT LEVEL (per ml.)

1 150 to 300
2 301 to 600
3 601 to 1,200
4 1,201 to 2,400
5 2,401 to 4,800
6 4,801 to 9,600
7 9,601 to 19,200
8 19,201 to 38,400
9 38,401 and over

Code to ALGAE GENERA (Producers)

Blue-green Algae

01 Agmenellum (Merismopedia)
02 Anacystis (Microcystis)
03 Anacystis
04 Coccochloris
05 Gomphosphaeria
06, 07, 08 Reserve
09 Other genus
10 Other genus

Filamentous blue-greens

11 Anabaena
12 Aphanizomenon
13 Arthrospira
14 Lyngbya
15 Oscillatoria
16 Phormidium
17 Raphidiopsis
18 Spirulina
19, 20, 21 Reserve
22 Other genus
23 Other genus

Coccoid green algae

24 Actinastrum
25 Ankistrodesmus
26 Chlorella-type
27 Chlorococcum
28 Closterium
29 Coelastrum
30 Crucigenia
31 Dictyosphaerium
32 Golenkinia
33 Lagerheimia
34 Micractinium
35 Oocystis
36 Palmellococcus
37 Pediastrum
38 Scenedesmus
39 Staurastrum
40 Tetradesmus
41 Tetrastrum
42, 43 Reserve
44 Other genus
45 Other genus

Filamentous green algae

46 Cladophora
47 Stichococcus
48 Stigeoclonium
49 Reserve
50 Other genus

Green flagellates

51 Chlamydomonas including Carteria
52 Euglena
53 Lepocinclis
54 Pandorina
55 Phacotus
56 Phacus
57 Trachelomonas
58 Reserve
59 Other genus

Other pigmented flagellates

60 Chromulina
61 Dinobryon
62 Gymnodinium
63 Peridinium
64 Reserve
65 Other genus

Diatoms (with chromatophores)

Centric

66 Biddulphia
67 Coscinodiscus
68 Cyclotella
69 Melosira
70 Rhizosolenia
71 Stephanodiscus
72 Other genus

Pennate

73 Achnanthes
74 Amphiprora
75 Amphora
76 Anomoeoneis
77 Asterionella
78 Caloneis
79 Cocconeis
80 Cymatopleura
81 Cymbella
82 Diatoma
83 Diploneis
84 Fragilaria
85 Gomphonema
86 Gyrosigma
87 Navicula
88 Nitzschia
89 Pleurosigma
90 Rhoicosphenia
91 Surirella
92 Synedra
93 Tabellaria
94, 95, 96 Reserve
97 Other genus
98 Other genus
99 Other genus

PLANKTON POPULATION

Identification Code for Diatom Species

No.	Species
01	Achnanthes lanceolata
02	Achnanthes minutissima
03	Achnanthes sp.
04	Amphiprora paludosa
05	Amphiprora sp.
06	Amphora ovalis
07	Amphora sp.
08	Anomoeoneis exilis
09	Asterionella formosa
10	Bacillaria paradoxa
11	Biddulphia laevis
12	Caloneis amphisbaena
13	Caloneis sp.
14	Ceratoneis arcus
15	Cocconeis pediculus
16	Cocconeis placentula
17	Cocconeis sp.
18	Coscinodiscus rothii
19	Coscinodiscus (brackish)
20	Coscinodiscus sp.
21	Cymatopleura solea
22	Cymatosira belgica
23	Cyclotella atomus
24	Cyclotella comta
25	Cyclotella kutzingiana
26	Cyclotella meneghiniana
27	Cyclotella pseudostelligera
28	Cyclotella stelligera
29	Cyclotella striata
30	Cyclotella sp.
31	Cymbella ventricosa
32	Cymbella tumida
33	Cymbella sp.
34	Denticula sp.
35	Diatoma elongatum
36	Diatoma vulgare
37	Diatoma sp.
38	Diploneis smithii
39	Diploneis sp.
40	Epithemia turgida
41	Epithemia sorex
42	Epithemia sp.
43	Eunotia sp. (first)
44	Eunotia sp. (second)
45	Fragilaria capucina
46	Fragilaria construens
47	Fragilaria crotonensis
48	Fragilaria pinnata
49	Fragilaria sp.
50	Frustulia sp.
51	Gomphonema olivaceum
52	Gomphonema sp.
53	Gyrosigma kutzingii
54	Gyrosigma sp.
55	Hantzschia amphioxys
56	Melosira ambigua
57	Melosira distans var. alpigena
58	Melosira granulata
59	Melosira binderana
60	Melosira islandica
61	Melosira italica
62	Melosira varians
63	Meridion circulare
64	Navicula cryptocephala
65	Navicula sp. (first)
66	Navicula sp. (second)
67	Nitzschia acicularis
68	Nitzschia tryblionella
69	Nitzschia denticula
70	Nitzschia (Lancelolatae group)
71	Nitzschia sp. (first)
72	Nitzschia sp. (second)
73	Opephora martyi
74	Pinnularia sp.
75	Pleurosigma delicatulum
76	Rhoicosphenia curvata
77	Rhizosolenia eriensis
78	Rhopalodia gibba
79	Rhopalodia sp.
80	Stephanodiscus astraea var. minutula
81	Stephanodiscus dubius
82	Stephanodiscus hantzschii
83	Stephanodiscus niagarae
84	Stephanodiscus sp.
85	Surirella brightwelli
86	Surirella ovata
87	Surirella striatula
88	Surirella sp.
89	Synedra acus
90	Synedra pulchella
91	Synedra nana
92	Synedra ulna
93	Synedra vaucheriae
94	Synedra sp.
95	Tabellaria fenestrata
96	Tabellaria flocculosa
97	Any entity not found above (first)
98	Any entity not found above (second)
99	Reserved for future entity
xx	Insignificant or population inadequate

PLANKTON POPULATION

Identification Codes of Microinvertebrate Genera and Count Levels of Most Abundant Genera

Genera of ROTIFERS
Key to counts per liter

1 5 to 10
2 11 to 20
3 21 to 40
4 41 to 80
5 81 to 160
6 161 to 320
7 321 to 640
8 641 to 1,680
9 1,681 and over

Genera of CRUSTACEA
Key to counts per liter

1 3 to 5
2 6 to 10
3 11 to 20
4 21 to 40
5 41 and over

Code to MICROINVERTEBRATES

Rotifers

01 Asplanchna
02 Brachionus (also Platyias)
03 Collotheca
04 Cephalodella
05 Chromogaster
06 Euchlanis
07 Filinia
08 Gastropus
09 Hexarthra (also Pedalia)
10 Kellicottia
11 Keratella
12 Lepadella
13 Monostyla (also Lecane)
14 Notholca
15 Philodina and similar contracted bdelloids
16 Ploesoma
17 Polyarthra
18 Pompholyx
19 Proales
20 Rotaria
21 Synchaeta
22 Trichocerca
23 to 45 Reserve
46 Other genus
47 Other genus
48 Other genus
49 Other genus

Cladocerans

50 Nauplii
51 Bosmina and related genera
52 Daphnia and related genera
53 Moina
54 Polyphemus
55 to 72 Reserve
73 Other genus
74 Other genus
75 Other genus

Copepods

76 Cyclops,Euclops, and Paracyclops
77 Diaptomus
78 to 97 Reserve
98 Other genus
99 Other genus

Blank—Insignificant or population inadequate

ORGANIC CHEMICALS

Although units of concentration may be assigned to the values reported herein (µg/l or parts per billion), it is essential that the user of these data consider additional associated information. Introspective examination of the data reported herein has indicated that comparison of concentration values obtained from samples of similar gallonage are more valid than samples of widely differing gallonage. In addition, recent experimental researches have shown that lower flow rates and lower sample volumes than those employed (5,000 gallons at 0.5 gpm) are substantially more efficient and should produce relatively higher concentration values with this method. The first in a series of changes designed to increase sampling efficiency is already underway at Water Pollution Surveillance System stations.

Concentration values reported for specific substances are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE. In light of an unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

Zeros when reported have been entered. A dash indicates that the respective results were not reported. An asterisk in the column showing end of sample date indicates that the determinations are for composited samples taken on and before the date shown. The extent of compositing can be determined by examining the gallons filtered, which is the sum of the applicable individual samples immediately above it.

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

The data entered in each column are as reported. Concentrations of alkalinity and hardness are reported in milligrams per liter as $CaCO_3$. A dash signifies that the particular test was not performed. Zeroes when meaningful have been entered. An asterisk preceding a number should be read as "less than" the number following it.

TRACE ELEMENTS AND OTHER DETERMINATIONS

For a discussion of the sensitivity limits of the determinations performed with spectrographic methods, see page 11.

BASIN 10

SOUTHWEST-LOWER MISSISSIPPI

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The Southwest-Lower Mississippi River basin contains 15 Public Health Service Water Pollution Surveillance System stations situated on 5 rivers. Four stations are on the Mississippi River mainstem below the confluence of the Ohio River, five are on the Arkansas River mainstem, and four are on the mainstem of the Red River. The Verdigris and the Ouachita Rivers, tributary to the Arkansas and Red Rivers, respectively, are also sampled.

Arkansas River: The headwaters of the Arkansas River are in the Rocky Mountains near Leadville, Colo. The river flows in a southeasterly course to its confluence with the Mississippi River. Irrigation places heavy demands on the stream in the semiarid and dry regions east of the mountains. Dissolved solids build up as a result of both natural and man-made pollution above Tulsa, Okla., and are subsequently reduced by dilution from other streams in Arkansas. Pueblo, Colo., is the only large community to use the Arkansas River as a municipal supply. The Verdigris River drains from eastern Kansas southward through Oklahoma and is confluent with the Arkansas River near Muskogee, Okla.

Red River: The Red River begins in the high plains of Texas. South of Amarillo in Palo Duro Canyon, the stream is degraded by rising salty ground water from several natural sources in this basin. Oil field pollution is being rapidly corrected. The Red River is subsequently diluted by the Washita River which enters Lake Texoma above Denison Dam and thereafter by several large tributaries. However, the variability of rainfall, and the operation of Denison Dam cause fluctuating mineral concentrations in the lower portion of this river. One municipality uses the Red River as a source of supply. The Red River is confluent to the Atchafalaya River which is a distributary of the lower Mississippi.

Ouachita River: The Ouachita River flows southward from central Arkansas and, in its lower reach, becomes the Black River. The Black River is tributary to the Red River about 30 miles downstream from Alexandria, La.

The Surveillance System station at West Memphis, Ark., monitors inflow to the lower Mississippi River and the New Orleans station monitors the discharge of the Mississippi to the Gulf of Mexico. Twin stations are installed at Delta, La., and Vicksburg, Miss., in order to

adequately monitor pollution in the presence of incomplete mixing of tributary flows from the Yazoo River.

During August and September 1963, at West Memphis, Vicksburg, and New Orleans and in July at Delta, the Mississippi River contained the pesticides, dieldrin and endrin. These are the first identifications, but not the first occurrences, of endrin by the PHS Water Pollution Surveillance System in surface waters and they were found at and upstream from an area where major fish kills have been observed in late fall-early winter every year since 1960. These positive identifications were made possible by development of improved analytical techniques involving thin-layer chromatography, electron-capture and microcoulometric titration gas chromatography, and infrared spectroscopy. The public health significance of the calculated pesticide concentrations is unknown. However, the necessity for an increased surveillance effort is apparent.

In this basin the high phytoplankton populations in the Arkansas, Red, and Verdigris Rivers (exceeding 100,000/milliliter) are contrasted with the low counts in the Mississippi and Ouachita Rivers. The algae of the upper Arkansas and Red Rivers are dominated by pennate diatoms but centric diatoms dominate elsewhere. The Arkansas, Red, and Verdigris Rivers develop a diverse algal population during the summer months, being unusually rich in a wide variety of blue green, green and yellow-brown forms. The basin is unique in having high winter populations of the yellow-brown flagellate *Chrysococcus*. The dominant centric diatoms include *Stephanodiscus hantzschii, S. astraea* var. *minutula, Melosira ambigua, M. granulata, Cyclotella meneghiniana,* and *Coscinodiscus rothii*. The more abundant pennate diatoms include *Nitzschia* spp. and *Synedra ulna* in the Arkansas River, and *Diploneis smithii* in the Red River.

Rotifer populations are generally high throughout the basin, reflecting the high algae counts. The highest rotifer count ever recorded for any network station was 15,190/liter at Alexandria on the Red River, September 3, 1963. The most abundant forms were *Keratella* and *Trichocerca*.

ARKANSAS RIVER AT PENDLETON FERRY, ARKANSAS

This is the last Water Pollution Surveillance System station on the Arkansas River before confluence with the Mississippi, 44 miles downstream. Samples are collected from the ferry at approximately midstream.

The nearest community above this station is Pine Bluff, Arkansas which is approximately 40 miles upstream. About 20% of the sewage from this city of 44,000 is treated by lagooning and the balance is discharged without treatment into the river. No use is made of the Arkansas River in this area for either irrigation or municipal supply.

736-499 O - 64 - 3

Station Location:	Arkansas River at Pendleton Ferry, Arkansas
Major Basin:	Southwest-Lower Mississippi River
Minor Basin:	Arkansas River-Van Buren to Mouth
Station at:	33°59' Latitude 91°23' Longitude
Miles above mouth:	44
Activation Date:	March 30, 1959
Sampled by:	Arkansas State Water Pollution Control Commission
Field Analysis by:	Arkansas State Water Pollution Control Commission
Other Cooperating Agencies:	Arkansas State Board of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Little Rock, Arkansas
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	158,201 square miles; 22,241 square miles probably noncontributing
Period of record:	1927 to present
Average discharge in record period:	42,250 cfs.
Maximum discharge in record period:	536,000 cfs.
Minimum discharge in record period:	850 cfs.

Remarks: Flows regulated by operations of power plants and upstream storage reservoirs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	–	.40
	Na	–	92
	K	–	5.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	–	10
	Cd	–	*5
	As	–	*50
	B	–	80
	P	–	38
	Fe	–	18
	Mo	–	*50
	Mn	–	*3
	Al	–	*25
	Be	–	*.13
	Cu	–	3
	Ag	–	*1.3
	Ni	–	5
	Co	–	*5
	Pb	–	*13
	Cr	–	15
	V	–	*25
	Ba	–	100
	Sr	–	525

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	–	–	April to June	5.5	.5
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE: ARKANSAS

MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN: ARKANSAS RIVER-VAL VERDEN TO MOUTH

STATION LOCATION: ARKANSAS RIVER AT PENDLETON FERRY, ARKANSAS

82

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA								DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL						ALPHA		BETA	
MO	DAY	YR.	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±			MO	DAY	pc/g	±	pc/g	±
5	29	63	6	19*	3	2	4	3	7	4	57	15	60	16	117	22								
6	26	63	7	23*	7	5	1	4	8	6	38	15	58	15	96	21								
7	31	63	8	16*	4	3	0	4	4	5	73	28	59	37	132	46								
8	28	63	9	25*	1	1	0	1	1	1	23	12	47	17	70	21								
9	25	63	10	23*	1	1	2	4	3	4	3	12	15	28	18	30								

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT PENDLETON FERRY, ARKANSAS

52

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
6	19	63	4500	20	20	290	0	180	0	3120	880	3370	700	68	5	88	2	52	1													
8	7	63	2700	0	0	330	100	150	20	1140	990	750	150	68	3	88	3	87	1													
8	14	63	3100	50	0	320	0	680	0	1270	840	750	70	68	3	88	3	51	1	52	1	87	1									
9	11	63	17900	2050	90	4170	20	250	0	8700	2570	2970	960	68	6	3	4	71	4	38	3	88	3	92	3	23	3	35	3	24	1	97	1
9	18	63	16300	90	70	1900	20	840	0	10760	2600	4790	1450	68	6	71	5	88	4	35	3	51	3	44	2	87	2	69	1	38	1	92	1

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT

PENDLETON FERRY, ARKANSAS 052

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																				
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
6	19	63	26	81	20	5	70	4	82	3	7	-	-	-											-							-	-
8	7	63	26	42	30	41	82	3	56	2	12	-	-	-											-							-	-
8	14	63	26	39	27	34	70	6	82	4	17	-	-	-											-							-	-
9	11	63	26	41	82	15	27	13	92	6	25	-	-	-											-							-	-
9	18	63	26	39	82	24	27	13	23	5	19	-	-	-											-							-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT PENDLETON FERRY, ARKANSAS 52

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
5	13	63	28.0	8.1	7.7	2.7	25	2.2	7.0	-	82	68	92	40	325	8	-	291	34000
5	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5900
5	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1800
6	5	63	24.0	8.7	7.9	7.2	34	2.2	8.6	-	168	110	140	50	52	41	.0	493	100000
6	12	63	-	3.6	7.6	3.6	41	2.2	8.8	-	222	110	164	35	30	50	-	573	9700
6	19	63	-	5.8	7.8	5.8	-	1.8	7.0	-	176	122	152	40	60	96	.0	502	-
7	10	63	30.0	7.2	8.2	6.6	-	1.5	8.6	-	475	114	168	30	190	185	-	1212	-
7	17	63	30.0	9.6	8.2	5.1	-	2.2	6.8	-	485	118	204	30	190	180	-	1210	6000
7	24	63	28.0	5.7	7.7	2.7	-	1.1	6.6	-	390	106	190	20	700	160	-	1055	2500
7	31	63	26.0	6.7	7.6	.8	42	1.7	5.9	-	140	80	128	30	450	94	-	519	-
8	7	63	29.0	7.6	8.1	4.6	30	2.2	6.4	-	172	108	174	30	165	82	-	537	-
9	4	63	-	7.5	7.5	1.5	15	-	-	-	290	94	222	30	28	98	-	781	-
9	11	63	28.0	11.7	8.1	11.5	29	2.6	6.9	-	210	164	224	35	64	80	-	627	-
9	18	63	25.5	7.8	8.1	5.0	38	1.6	6.8	-	206	126	208	30	85	16	-	627	-
9	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	25	63	25.5	9.0	7.9	1.5	39	2.0	5.0	-	305	98	164	40	400	104	-	777	*100

STREAM FLOW DATA -- 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Little Rock, Arkansas
Operated by U.S. Geological Survey

STATE Arkansas

MAJOR BASIN Southwest-Lower Mississippi River

MINOR BASIN Arkansas River-Van Buren to Mouth

STATION LOCATION Arkansas River at
Pendleton Ferry, Arkansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	46.100	28.100	21.500	16.800	8.810	8.810	12.800	34.900	9.080	11.900	10.600	3.600
2	42.600	40.500	30.700	17.300	8.060	10.200	12.400	51.900	9.890	22.000	10.200	4.200
3	39.800	44.000	32.100	16.800	8.810	13.600	12.100	55.100	10.800	19.300	11.400	4.580
4	41.200	39.800	29.300	16.300	9.890	16.800	11.100	48.900	11.100	14.800	13.300	4.450
5	44.700	31.400	26.300	15.400	10.800	20.300	11.800	40.500	10.800	11.900	17.800	4.320
6	53.500	25.100	23.900	13.600	10.500	22.700	19.800	30.000	9.890	11.000	17.800	4.100
7	62.800	21.500	22.700	15.000	9.080	23.300	22.700	23.900	9.080	11.400	17.800	3.700
8	59.200	20.300	23.900	17.300	8.560	22.700	20.300	20.300	9.080	11.400	16.300	3.310
9	48.200	22.700	24.500	19.300	8.810	19.800	17.300	18.300	9.080	10.600	12.400	3.500
10	39.800	27.500	23.900	19.300	9.350	20.900	14.500	15.800	8.310	9.800	9.800	5.200
11	33.500	32.100	22.100	20.900	9.890	28.700	12.100	14.000	7.830	9.400	9.050	6.700
12	35.600	32.800	19.800	26.300	9.890	35.600	10.800	12.100	7.600	8.700	8.520	6.700
13	38.400	31.400	16.800	28.100	9.890	37.700	10.200	11.100	7.600	7.820	7.820	5.950
14	34.200	28.100	15.000	26.900	9.350	34.900	10.200	10.800	7.830	8.520	7.820	8.700
15	30.000	25.700	16.800	25.100	8.810	32.800	10.200	10.200	7.600	8.880	7.300	16.800
16	32.100	23.300	16.800	22.700	9.350	37.700	9.620	9.080	8.060	8.350	6.400	18.300
17	29.300	19.800	15.400	19.300	10.500	46.100	9.080	8.060	8.810	8.180	5.650	16.800
18	26.900	17.300	14.000	16.800	10.500	54.300	8.310	7.830	9.890	13.300	6.250	14.800
19	32.100	15.000	12.800	15.800	10.200	55.100	7.830	6.980	9.620	13.800	6.700	12.800
20	41.900	13.600	11.400	13.600	9.620	51.100	7.390	6.780	9.080	18.800	6.400	10.600
21	46.800	12.800	10.200	13.600	9.350	48.200	6.980	6.590	8.060	27.500	6.400	9.400
22	49.600	12.100	10.500	13.200	8.810	46.800	6.780	6.590	7.390	28.100	5.950	9.800
23	44.700	11.100	12.400	13.200	8.810	46.100	6.590	6.220	8.060	26.400	4.950	10.200
24	36.300	11.400	20.300	12.100	8.810	44.000	6.220	6.050	8.310	23.600	4.320	9.400
25	31.400	12.400	31.400	10.200	8.810	40.500	5.890	5.740	7.390	20.400	4.580	11.900
26	30.000	12.400	30.700	9.080	8.560	37.000	5.600	5.600	6.590	17.300	5.350	14.800
27	29.300	11.800	23.300	7.830	8.560	31.400	5.600	5.890	6.050	12.400	5.500	12.800
28	27.500	11.800	17.300	7.600	8.060	23.300	6.220	6.400	5.600	11.000	4.950	9.800
29	25.700	12.100	15.400	7.830		18.300	7.390	7.600	5.460	11.000	4.700	8.520
30	23.900	12.800	14.500	8.810		16.800	34.000	8.060	5.740	11.900	4.100	7.650
31	22.700		15.400	9.350		15.000		8.560		11.400	3.500	

ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS

This Public Health Service Water Pollution Surveillance System station is located about midway between the Fort Smith and Pendleton Ferry stations in central Arkansas. Samples are collected at the pipe yard of the Little Rock Water Department. The influences of salt which affect quality upstream at Fort Smith have been moderated at Little Rock by the influx of waters with low mineral concentrations. The nearest community which discharges wastes to the river is Morrilton, Arkansas, 57 miles upstream. This sampling point serves as a field test station for pollution surveillance equipment being considered for use in the Surveillance System.

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Station Location:	Arkansas River at Little Rock, Arkansas
Major Basin:	Southwest-Lower Mississippi River
Minor Basin:	Arkansas River-Van Buren to Mouth
Station at:	34°45' Latitude 92°16' Longitude
Miles above mouth:	167 estimated
Activation Date:	July, 1963
Sampled by:	Arkansas Water Pollution Control Commission
Field Analysis by:	Arkansas Water Pollution Control Commission
Other Cooperating Agencies:	Arkansas State Board of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Little Rock, Arkansas
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	158,201 square miles with 22,241 square miles probably non-contributing
Period of record:	1927 to present
Average discharge in record period:	42,250 cfs.

Maximum discharge in record period: 536,000 cfs.

Minimum discharge in record period: 850 cfs.

Remarks: Flows affected by operations of power plants and reservoirs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval	
Analysis by wet or flame methods. Results in mg/l	F		
	Na		
	K		
Analysis by Spectrographic methods. Results in micrograms per liter	Zn		
	Cd		
	As		
	B		
	P		
	Fe		
	Mo		
	Mn		
	Al		
	Be		
	Cu		
	Ag		
	Ni		
	Co		
	Pb		
	Cr		
	V		
	Ba		
	Sr		

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	–	–	April to June	–	–
January to March	–	–	July to September	1.8	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS 131

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
					ALPHA						BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
7	24	63	8	7	2	5	1	3	3	6	101	34	71	18	172	38					
7	31	63	8	14	3	2	1	2	4	3	55	15	52	16	107	22					
8	7	63	8	21	6	3	2	3	8	4	63	18	41	18	104	25					
8	15	63	8	27	1	1	0	2	1	2	22	13	43	15	65	20					
8	22	63	9	16	0	0	2	3	2	3	3	3	32	8	35	9					
8	28	63	9	17	1	1	3	3	4	3	8	12	16	17	24	21					
9	4	63	9	23	0	1	2	3	2	3	6	3	32	8	38	9					
9	11	63	10	2	0	0	1	2	1	2	5	5	32	17	37	18					
9	18	63	10	8	9	8	0	2	9	8	56	65	38	31	94	72					
9	25	63	10	14	4	4	2	4	6	6	50	14	48	15	98	21					

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See back for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Amoebas) (Number per ml.)	NUMBER PER LITER	ROTIFERS										NUMBER PER LITER	CRUSTACEA								NEMATODES (Roundworms) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See back for Codes)											GENERA AND COUNT LEVEL (See back for Codes)										
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
9	4	63										1	1	1											–							–	1

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER—VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS 131

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
9	4	63	6200	970	110	2410	20	90	0	1760	880	970	520	3	3	38	3	35	2	25	2	44	2										

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	CHLOROFORM EXTRACTABLES NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
7	23	63	7	31	4959	86	25	61	0	4	14	2	1	10	1	3	1	0	3
8	7	63	8	15	5248	94	38	56	1	9	14	3	2	9	0	5	3	1	5
9	4	63	9	11	4641	179	71	108	2	17	26	2	1	21	2	9	6	2	9

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER—VAN BUREN TO MOUTH

STATION LOCATION ARKANSAS RIVER AT LITTLE ROCK, ARKANSAS

131

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (silica units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	24	63	28.5	6.5	7.8	.6	-	1.2	4.8	-	150	96	116	20	500	96	-	502	6300
7	31	63	29.0	7.9	7.8	2.2	28	1.1	4.0	-	95	80	122	30	270	84	-	453	-
8	7	63	28.0	6.8	7.6	.7	26	2.0	6.2	-	174	70	140	40	300	52	-	517	-
8	22	63	-	-	-	-	-	-	-	-	220	92	152	0	*25	60	.3	450	-
8	28	63	-	-	-	-	-	-	-	-	195	112	152	0	*25	65	.0	520	-
9	4	63	29.0	7.5	7.4	.9	10	-	-	-	170	110	110	0	*25	60	.0	500	-
9	11	63	28.5	10.8	8.5	5.4	28	1.4	5.0	-	-	-	-	-	-	-	-	-	-
9	18	63	24.5	7.4	8.1	.9	19	2.0	6.4	-	434	98	188	30	470	104	-	986	-
9	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4800
9	25	63	23.0	8.7	7.9	.7	58	.8	4.4	-	-	-	-	-	-	-	-	-	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Little Rock, Arkansas
Operated by U.S. Geological Survey

STATE: Arkansas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Arkansas River-Van Buren to Mouth

STATION LOCATION: Arkansas River at Little Rock, Arkansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	46.100	28.100	21.500	16.800	8.810	8.810	12.800	34.900	9.080	11.900	10.600	3.600
2	42.600	40.500	30.700	17.300	8.060	10.200	12.400	51.900	9.890	22.000	10.200	4.200
3	39.800	44.000	32.100	16.800	8.810	13.600	12.100	55.100	10.800	19.300	11.400	4.580
4	41.200	39.800	29.300	16.300	9.890	16.800	11.100	48.900	11.100	14.800	13.300	4.450
5	44.700	31.400	26.300	15.400	10.800	20.300	11.800	40.500	10.800	11.900	17.800	4.320
6	53.500	25.100	23.900	13.600	10.500	22.700	19.800	30.000	9.890	11.000	17.800	4.100
7	62.800	21.500	22.700	15.000	9.080	23.300	22.700	23.900	9.080	11.400	17.800	3.700
8	59.200	20.300	23.900	17.300	8.560	22.700	20.300	20.300	9.080	11.400	16.300	3.310
9	48.200	22.700	24.500	19.300	8.810	19.800	17.300	18.300	9.080	10.600	12.400	3.500
10	39.800	27.500	23.900	19.300	9.350	20.900	14.500	15.800	8.310	9.800	9.800	5.200
11	33.500	32.100	22.100	20.900	9.890	26.700	12.100	14.000	7.830	9.400	9.050	6.700
12	35.600	32.900	19.800	26.300	9.890	35.600	10.800	12.100	7.600	8.700	8.520	6.700
13	38.400	31.400	16.800	28.200	9.890	37.700	10.200	11.100	7.600	7.820	7.820	5.950
14	34.200	28.100	15.000	26.900	9.350	34.900	10.200	10.800	7.830	8.520	7.820	8.700
15	30.000	25.700	16.800	25.100	8.810	32.800	10.200	10.200	7.600	8.880	7.300	16.800
16	32.100	23.300	16.800	22.700	9.350	37.700	9.620	9.080	8.060	8.350	6.400	18.300
17	29.300	19.800	15.400	19.300	10.500	46.100	9.080	8.060	8.810	8.180	5.650	16.800
18	26.900	17.300	14.000	16.800	10.500	54.300	8.310	7.830	9.890	13.300	6.250	14.800
19	32.100	15.000	12.800	15.800	10.200	55.100	7.830	6.980	9.620	13.800	6.700	12.800
20	41.900	13.600	11.400	13.600	9.620	51.100	7.390	6.780	9.080	18.800	6.400	10.600
21	46.800	12.800	10.200	13.600	9.350	48.200	6.980	6.590	8.060	27.500	6.400	9.400
22	49.600	12.100	10.500	13.200	8.810	46.800	6.780	6.590	7.390	28.100	5.950	9.800
23	44.700	11.100	12.400	13.200	8.810	46.100	6.590	6.220	8.060	26.400	4.950	10.200
24	36.300	11.400	20.300	12.100	8.810	44.000	6.220	6.050	8.310	23.600	4.320	9.400
25	31.400	12.400	31.400	10.200	8.810	40.500	5.890	5.740	7.390	20.400	4.580	11.900
26	30.000	12.400	30.700	9.080	8.560	37.000	5.600	5.600	6.590	17.300	5.350	14.800
27	29.300	11.800	23.300	7.830	8.560	31.400	5.600	5.890	6.050	12.400	5.500	12.800
28	27.500	11.800	17.300	7.600	8.060	23.300	6.220	6.400	5.600	11.000	4.950	9.800
29	25.700	12.100	15.400	7.830		18.300	7.390	7.600	5.460	11.000	4.700	8.520
30	23.900	12.800	14.500	8.810		16.800	14.000	8.060	5.740	11.900	4.100	7.650
31	22.700		15.400	9.350		15.000		8.560		11.400	3.500	

ARKANSAS RIVER NEAR FORT SMITH, ARKANSAS

The Public Health Service Water Pollution Surveillance System station near Fort Smith, Arkansas is located at the Oklahoma-Arkansas State line. Samples are collected at U. S. Highway 64 Bridge.

Upstream from Fort Smith and below Ponca City, the Salt Fork of the Arkansas River and the Cimarron River contribute heavy salt loadings. These are diluted by Verdigris, Grand, Illinois, and Canadian River flows so that total dissolved solids concentrations are generally between 350 and 700 mg/l.

The principal industry in the Ponca City-Fort Smith area is petroleum production and refining. Many of the fields in this area were developed prior to development of adequate brine disposal techniques. Consequently, these old fields still are a source of salt loading which is flushed from evaporation ponds during the rainy season.

The characteristics of the upstream salt sources were investigated in the Arkansas-Red River Water Quality Conservation Project conducted by the Public Health Service. A final report is scheduled to be available in 1964.

736-499 O - 64 - 4

Station Location:	Arkansas River near Fort Smith, Arkansas
Major Basin:	Southwest-Lower Mississippi River
Minor Basin:	Arkansas River-Tulsa to Van Buren
Station at:	35°24' Latitude 94°26' Longitude
Miles above mouth:	362
Activation Date:	August 17, 1959
Sampled by:	Arkansas Water Pollution Control Commission
Field Analysis by:	Arkansas Water Pollution Control Commission U.S. Public Health Service
Other Cooperating Agencies:	Arkansas State Board of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Van Buren, Arkansas
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	150,483 square miles including 22,241 probably noncontributing.
Period of record:	1927 to present
Average discharge in record period:	32,080 cfs.
Maximum discharge in record period:	850,000 cfs.
Minimum discharge in record period:	300 cfs.
Remarks:	Flows regulated by operation of power plants and reservoirs.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	–	.55
	Na	–	195
	K	–	6.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	–	9
	Cd	–	*9
	As	–	*50
	B	–	112
	P	–	43
	Fe	–	77
	Mo	–	*47
	Mn	–	*5
	Al	–	*43
	Be	–	*.22
	Cu	–	4
	Ag	–	*2.2
	Ni	–	9
	Co	–	*9
	Pb	–	*22
	Cr	–	26
	V	–	*43
	Ba	–	133
	Sr	–	761

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	± –	Composite Interval	pc/l	± –
October to December	–	–	April to June	–	–
January to March	–	–	July to September	6.7	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-TULSA TO VAN BUREN

STATION LOCATION ARKANSAS RIVER NEAR FORT SMITH, ARKANSAS

53

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY		
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
4	24	63	5	22*	0	4	0	3	6	5	72	30	76	31	148	43						
5	22	63	6	24*	10	8	1	3	11	9	89	33	64	9	153	34						
6	26	63	7	23*	2	2	0	5	2	5	81	13	77	42	158	44						
7	31	63	8	16*	25	16	2	5	27	17	266	83	86	40	352	92						
8	28	63	9	25*	3	3	3	4	6	5	31	24	73	29	104	38						
9	25	63	10	23*	46	29	0	4	46	29	266	148	34	29	300	151						

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER-TULSA TO VAN BUREN

STATION LOCATION ARKANSAS RIVER NEAR FORT SMITH, ARKANSAS 053

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																	
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	ROTIFERS										CRUSTACEA						NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
4	17	63	26	59	80	23	58	7	56	6	5	-	-	1120	11	8	2	6														
5	13	63	82	65	27	11	92	5	67	3	16	-	-	-											0						0	1
5	15	63	67	51	80	17	26	14	82	13	5	-	-	-											-						-	-
6	12	63	18	42	26	26	82	10			22	-	-	-											-						-	-
6	19	63	26	39	20	19	82	13	70	8	21	0	-	-											-						-	-
7	3	63										-	-	-											-						-	-
7	7	63										-	-	-											-						-	-
7	15	63	47	45	36	15	65	4			36	-	-	-											-						-	-
8	7	63										-	-	-											-						-	-
8	21	63	26	76	67	7	71	4	92	3	10	-	-	-											-						-	-
9	11	63										-	-	156	2	5									0						0	0
9	18	63										-	-	-											-						-	-

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER—TULSA TO VAN BUREN

STATION LOCATION ARKANSAS RIVER NEAR FORT SMITH, ARKANSAS

53

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	0 AUG	COUNT LEVEL	GENUS	COUNT LEVEL
4	17	63	17000	290	130	6260	0	760	380	8950	210	1970	340	68	6	24	5	71	5	52	3	26	2	38	2	65	2	35	2	44	1	69	1
5	13	63	2200	0	70	900	0	40	0	1100	110	1060	460	17	3	69	2	71	2														
5	15	63	21800	220	180	12800	0	840	0	2240	5480	1690	3370	17	6	88	6	35	4	71	4	26	3	38	3	68	3	51	2	52	2	25	2
6	12	63	14500	0	290	4330	0	170	190	4180	5330	3420	1510	67	4	38	4	24	4	68	4	71	2	26	2	69	2	35	1	17	1	32	1
6	19	63	23200	0	140	5540	0	1990	0	8110	7440	3070	950	68	6	88	6	38	5	69	4	74	4	71	3	51	3	35	3	24	3	87	3
7	3	63	*	—	—	—	—	—	—	—	—	—	—																				
7	7	63	4700	20	0	1180	290	290	20	1570	1280	580	230	38	2	35	1	52	1	50	1												
7	15	63	2100	0	0	290	0	90	0	1300	420	550	590	69	2	84	1	38	1														
8	7	63	*	—	—	—	—	—	—	—	—	—	—																				
8	21	63	13800	330	210	3090	410	130	20	6750	2860	2820	770	68	6	88	4	24	4	38	3	92	2	50	2	35	2	71	2	31	1		
9	11	63	*	—	—	—	—	—	—	—	—	—	—																				
9	18	63	*	—	—	—	—	—	—	—	—	—	—																				

* TOO TURBID TO COUNT

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARKANSAS RIVER—TULSA TO VAN BUREN

STATION LOCATION ARKANSAS RIVER NEAR FORT SMITH, ARKANSAS

53

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
4	3	63	20.0	3.9	7.8	1.8	110	1.1	3.6	–	265	116	215	35	1600	60	.7	709	–
4	10	63	20.0	–	7.7	–	110	–	–	–	286	150	233	80	230	85	1.1	945	3500
4	11	63	20.0	3.9	7.8	1.8	110	1.1	3.6	–	265	116	215	35	1600	60	.7	709	–
4	17	63	20.0	3.2	7.9	2.0	108	1.0	3.4	–	310	180	255	40	75	80	1.4	985	5000
4	24	63	–	–	8.1	–	103	–	–	–	335	176	279	25	40	90	.9	737	#100
5	1	63	17.0	9.2	7.4	–	70	2.2	8.4	–	114	82	119	60	800	20	.0	390	1900
5	8	63	19.8	–	7.8	–	42	3.0	9.0	–	166	118	178	55	150	40	.0	521	1300
5	15	63	26.0	7.3	8.4	2.7	31	1.7	6.8	–	298	150	212	60	41	78	–	789	3600
5	22	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	7000
5	29	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2000
6	5	63	26.0	6.6	7.8	3.1	–	2.6	8.9	–	275	126	187	40	250	124	.1	821	6000
6	12	63	–	7.2	8.2	5.1	42	2.6	8.8	–	192	138	204	45	180	56	–	525	8700
6	19	63	25.0	–	8.4	–	192	2.0	8.3	–	575	152	242	40	88	174	.1	1318	–
6	26	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	300
7	3	63	–	–	–	–	–	–	–	–	710	136	340	5	1000	155	.0	1640	–
7	10	63	27.0	10.3	8.2	5.6	–	2.3	9.0	–	620	118	360	10	220	160	.6	1400	–
7	17	63	27.5	5.6	7.8	–	–	1.7	5.8	–	530	130	310	15	1500	175	.3	1260	65000
7	24	63	30.0	8.0	7.7	2.9	–	.6	4.4	–	160	100	170	10	700	65	.2	450	17000
7	31	63	26.0	9.3	7.8	5.6	92	1.9	6.6	–	430	128	250	15	650	90	.5	900	–
8	7	63	29.0	10.6	8.0	4.2	52	1.9	6.2	–	180	96	170	10	650	60	.2	470	–
8	14	63	–	–	–	–	–	–	–	–	260	130	200	10	140	90	.5	730	–
8	21	63	–	–	–	–	–	–	–	–	390	124	232	5	26	105	.0	990	–
8	28	63	–	–	–	–	–	–	–	–	180	134	204	5	*25	175	.0	540	–
9	3	63	30.0	8.0	7.8	1.2	–	–	–	–	220	160	260	0	*25	88	.2	690	–
9	11	63	27.5	1.9	7.8	–	126	1.0	2.4	–	220	120	190	5	1500	72	.6	590	–
9	18	63	19.5	9.3	8.1	2.8	70	1.9	6.0	–	370	104	176	25	800	82	.4	850	–
9	24	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6900
9	25	63	18.0	8.4	7.9	1.7	44	.6	4.0	–	250	100	152	10	4000	75	.2	590	–

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Van Buren, Arkansas
Operated by U.S. Geological Survey

STATE: Arkansas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Ark. River-Tulsa to Van Buren

STATION LOCATION: Arkansas River near Fort Smith, Arkansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	40.000	37.600	21.500	11.400	7.150	6.400	6.400	44.800	9.320	11.700	15.200	3.800
2	42.400	28.100	18.700	10.600	6.650	6.400	10.300	32.900	8.460	10.600	16.200	3.200
3	49.600	22.700	16.700	7.920	6.400	5.940	22.100	24.500	6.900	11.400	14.300	2.480
4	61.000	19.200	16.200	8.730	5.360	5.140	18.700	19.200	7.400	11.400	15.200	2.160
5	61.000	17.700	18.700	9.640	5.940	4.720	14.700	15.200	7.650	11.000	10.600	3.010
6	47.200	17.200	20.900	12.500	6.650	5.710	11.700	12.100	6.900	9.000	8.190	6.330
7	35.200	19.200	19.700	11.700	6.900	10.200	9.640	10.600	5.820	9.320	7.650	7.400
8	28.700	26.300	18.700	15.200	7.400	17.200	7.200	9.640	5.820	8.460	7.150	7.150
9	32.900	26.900	18.200	19.700	7.400	17.700	6.900	8.730	6.400	7.150	6.400	5.710
10	39.200	26.900	13.800	21.500	7.400	15.700	7.150	8.460	6.650	7.920	6.650	7.130
11	31.500	24.500	12.500	20.900	5.820	14.300	7.400	7.920	5.820	8.190	6.650	18.700
12	25.100	21.500	14.300	18.200	6.170	13.800	7.400	7.400	6.650	7.920	5.600	20.900
13	20.900	19.200	14.300	16.700	8.460	22.700	6.650	6.400	6.900	6.650	4.940	18.700
14	16.200	16.200	12.500	15.200	8.730	32.200	5.940	5.600	7.150	8.460	5.940	16.200
15	12.100	12.900	12.100	12.900	8.460	30.100	5.140	4.830	6.900	8.460	6.650	14.300
16	16.200	10.300	11.000	12.500	7.920	28.700	4.520	4.620	6.900	9.450	6.170	10.600
17	36.000	9.320	8.730	11.000	7.400	28.100	4.940	4.940	5.710	24.200	6.170	8.730
18	39.200	8.730	8.190	11.000	6.650	27.500	5.040	5.250	4.300	26.900	6.170	10.300
19	42.400	8.190	9.320	10.600	6.400	26.900	4.940	5.140	5.040	23.900	4.830	10.300
20	34.400	6.900	9.640	11.000	7.150	26.900	4.830	4.940	6.900	22.700	4.100	9.320
21	26.900	7.920	17.900	9.640	6.900	26.300	4.520	4.200	5.820	18.700	4.720	10.600
22	24.500	8.460	30.100	6.900	6.650	25.700	3.900	4.000	4.520	14.700	5.940	16.700
23	24.500	7.920	28.100	7.400	6.400	22.700	3.400	4.100	4.100	10.300	5.940	12.900
24	25.700	6.400	18.700	6.650	5.940	18.700	4.000	3.800	3.600	10.300	5.250	9.000
25	24.500	7.400	13.800	6.400	5.040	12.100	4.200	3.400	3.200	9.960	4.830	8.190
26	22.700	5.940	12.100	8.190	5.140	10.300	5.710	3.600	4.200	9.960	3.800	7.400
27	20.900	6.400	10.300	8.190	5.820	11.000	12.600	5.040	8.140	9.320	2.900	6.900
28	18.200	15.200	10.600	5.710	5.940	9.960	33.900	5.940	26.900	7.650	3.300	6.900
29	19.200	23.300	12.100	5.040		8.730	52.900	7.650	23.900	6.400	4.830	6.650
30	37.600	23.900	12.500	5.820		7.920	52.900	8.730	16.200	8.730	4.720	5.140
31	40.800		12.100	6.170		7.650		9.640		9.960	4.100	

ARKANSAS RIVER NEAR PONCA CITY, OKLAHOMA

This station is located approximately fifty river miles downstream from the Oklahoma-Kansas State line. Samples are taken from the downstream side of old U.S. Highway 60 Bridge, east of Ponca City.

There is no known municipal use made of this river upstream from Ponca City and below Coolidge. The closest city is Arkansas City, Kansas, located at the State line.

The region is largely agricultural with industrialization in the Wichita area. Hutchinson, Kansas is the site of a salt mine and some natural salt is contributed by Rattlesnake Creek. Oil fields are located in the vicinity of Great Bend, Kansas.

The Arkansas River at Ponca City, Oklahoma has shown high phosphate concentrations, averaging over 1 ppm since October 1962, presumably from farm fertilization.

A very high population of algae appeared in the plankton sample from Ponca City, Oklahoma which was collected April 15, 1963. This followed a sharp increase of algae during March. The sample of April 15 had a total count of 316,800 per milliliter with over 250,000 of these being diatoms.

A variety of algae were present in the August 5 sample. Total algae numbered over 22,000. An unusually large population of 1,070 per liter of the rotifer Keratella was also present. These observations indicate organic enrichment of the water.

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Station Location:	Arkansas River near Ponca City, Oklahoma
Major Basin:	Southwest-Lower Mississippi River
Minor Basin:	Arkansas River, Kans.-Colorado Line to Tulsa
Station at:	36°42' Latitude 97°03' Longitude
Miles above mouth:	644
Activation Date:	April 7, 1958
Sampled by:	Ponca City Water Department
Field Analysis by:	Ponca City Water Department U.S. Public Health Service
Other Cooperating Agencies:	Oklahoma State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Ralston, Oklahoma
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	54,465 square miles, 7,615 square miles probably noncontributing
Period of record:	1925 to present
Average discharge in record period:	4,749 cfs.

Maximum discharge in record period: 179,000 cfs.

Minimum discharge in record period: 14 cfs.

Remarks: Salt Fork, Arkansas River enters between Pollution Surveillance System station and gaging station. Flows affected by operations of John Martin Reservoir (Colorado) and Great Salt Plains Reservoir (Oklahoma).

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.55	1.15
	Na	160	470
	K	7.8	12
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*9	10
	Cd	*8	*10
	As	*2	*96
	B	102	144
	P	*41	*48
	Fe	49	24
	Mo	*28	*39
	Mn	*2	*5
	Al	—	*48
	Be	*.2	*.2
	Cu	9	*5
	Ag	*2	*2
	Ni	*4	*10
	Co	*16	*10
	Pb	*41	*24
	Cr	*4	24
	V	*8	*48
	Ba	262	96
	Sr	1310	1110

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.2	.3	April to June	5.9	.5
January to March	—	—	July to September	6.5	.9

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER NEAR PONCA CITY, OKLAHOMA

I

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	23	-	-	-	-	-	-	142	66	41	15	183	68						
10	8	62	10	31	-	-	-	-	-	-	79	64	66	17	145	66						
10	15	62	11	9	-	-	-	-	-	-	30	25	27	29	57	38						
10	22	62	11	28	1	2	8	5	9	5	32	23	26	30	58	38						
10	29	62	12	22	-	-	-	-	-	-	22	25	21	30	43	39						
11	26	62	12	12*	1	3	3	4	4	5	32	30	39	36	71	47						
12	24	62	1	23*	0	2	5	5	5	5	34	26	46	34	80	43						
1	29	63	2	20*	1	2	12	9	13	9	20	28	32	40	52	49						
2	25	63	3	11*	3	4	1	4	4	6	42	27	42	31	84	41						
3	25	63	4	8*	2	3	11	5	13	6	129	10	88	10	217	14						
4	29	62	5	17*	0	0	0	6	0	6	25	7	58	28	83	39						
5	31	63	6	13*	1	3	2	5	3	6	65	32	84	40	152	51						
6	24	63	7	10*	5	9	3	4	8	10	445	80	110	19	555	82						
7	29	63	8	16*	30	22	2	3	32	22	305	148	69	18	374	149						
8	26	62	9	23*	0	0	9	9	9	9	7	3	81	21	88	21						
9	30	63	10	22*	10	6	2	3	12	7	98	22	64	19	162	29						

PLANKTON POPULATION

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER NEAR PONCA CITY, OKLAHOMA 001

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND BREATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml)	ROTIFERS										CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	48	12	71	11	73	11	26	8	58	-	-	-											-							-	-
10	15	62	82	48	23	28	26	8	48	3	13	-	-	1											0							0	0
11	5	62	97	27	26	15	71	7	68	4	47	-	-	2											0							0	0
11	19	62	26	23	51	10	71	10	72	8	49	40	-	0											0							0	0
12	3	62	51	15	85	13	71	10	72	7	55	50	-	1											0							0	0
12	17	62	71	20	51	12	85	11	72	6	51	-	-	0											0							0	0
1	7	63	71	22	70	13	82	11	51	8	46	-	-	0											0							0	0
1	21	63	26	14	51	12	65	9	82	9	56	-	-	0											0							1	0
2	4	63	70	30	82	9	26	7	65	5	49	-	-	1											0							1	0
2	18	63	71	13	72	13	73	12	86	10	52	-	-	0											0							0	0
3	4	63	71	38	72	9	51	8	73	8	37	-	-	1											0							0	0
3	18	63	82	30	65	11	26	11	51	9	39	-	-	0											0							0	0
4	1	63	26	22	82	21	71	16	72	6	35	-	-	-											0							0	0
4	15	63	71	40	26	25	4	9	82	9	17	-	-	2											-							-	-
4	20	63	26	44	23	37	71	8	27	7	4	-	-	1											0							0	0
5	20	63	26	58	27	19	82	6	67	4	13	-	-	6290	2	9									0							0	0
6	3	63										-	-	-											6	50	2					0	0
6	17	63										-	-	-											-							-	-
7	1	63										-	-	-											-							-	-
7	17	63										-	-	-											-							-	-
8	5	63	26	76	58	7	67	5	27	3	9	-	-	1070	11	8									-							-	-
8	19	63	26	93	70	2	58	1	67	1	3	-	-	2010	2	9	22	4	11	3	13	3	21	1	0							0	0
9	3	63	26	89	70	3	23	1	82	1	6	-	-	1											10	50	2					0	0
9	16	63										-	-	-											0							0	0
																									-							-	-

PLANKTON POPULATION

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER NEAR

PONCA CITY, OKLAHOMA

1

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	1000	0	0	80	0	40	0	40	790	40	170	88	2	84	1	97	1														
10	15	62	51000	630	1310	8250	0	1760	140	34200	4730	2120	1310	71	7	68	7	69	6	26	5	38	4	88	4	24	4	51	4	17	4	97	3
11	5	62	73400	410	1760	5450	0	3060	90	56030	6620	5630	3110	69	8	68	8	88	5	71	5	51	5	26	4	17	4	91	4	38	3	52	2
11	19	62	23700	1160	210	1410	0	1950	120	11180	7660	1660	1040	68	6	88	5	69	4	91	4	51	4	85	3	3	3	74	3	71	2	87	2
12	3	62	7400	70	50	790	0	340	20	1940	4210	1530	3600	88	4	68	3	69	3	85	3	91	3	38	2	80	1	51	1	87	1	97	1
12	17	62	1300	20	20	110	0	70	70	330	700	150	1140	88	1	68	1																
1	7	63	2100	0	40	150	0	330	0	420	1120	480	1390	88	3	71	1	51	1														
1	21	63	600	0	20	90	0	220	0	40	180	70	150	65	1																		
2	4	63	200	0	0	30	0	90	0	0	60	30	120																				
2	18	63	2400	20	40	70	0	840	310	290	840	180	1410	51	3	88	2	68	1	65	1												
3	4	63	31800	80	920	170	0	12680	4450	10920	2600	2600	2650	52	6	51	6	65	5	88	4	17	3	55	1	97	1	85	1	91	1		
3	18	63	7400	20	0	420	0	1500	40	3850	1610	240	1280	52	3	51	3	87	2	88	2	85	1	45	1	91	1						
4	1	63	79600	2730	7730	17850	0	2810	2820	32130	13570	6720	670	68	7	71	7	26	6	17	6	88	6	38	5	3	5	65	5	44	5	51	4
4	15	63	316900	1090	14810	41030	0	4750	3570	98280	153330	10040	2020	88	9	68	9	74	8	71	7	26	7	17	7	38	6	51	5	30	5	65	5
4	20	63	128700	1720	3570	20480	0	3360	80	87700	11760	21840	11130	68	9	88	7	38	6	25	5	17	5	26	5	52	4	30	4	3	4	35	4
5	20	63	55000	1180	2600	27010	0	1510	0	15750	6970	14950	3650	68	7	38	6	25	5	24	5	26	5	17	4	40	3	3	3	71	3	40	3
6	3	63	3100	0	20	260	0	90	0	1850	880	730	3080	38	1																		
6	17	63	54000	550	460	8030	0	1270	0	29690	14030	21130	8650	24	4	38	4	26	3	52	3	25	3	44	3	69	2	3	2	17	2	30	1
7	1	63	*	-	-	-	-	-	-	-	-	-	-																				
7	17	63	*	-	-	-	-	-	-	-	-	-	-																				
8	5	63	22400	70	200	3260	0	1050	40	11570	6230	11110	970	68	7	88	5	87	3	25	3	35	3	38	3	69	2	52	2	55	2	57	1
8	19	63	300	0	80	20	0	20	20	120	60	40	40																				
9	3	63	52700	390	190	9120	0	320	20	36570	6000	11420	4090	68	8	88	6	38	5	24	5	25	4	71	3	34	2	31	1	69	1	3	1
9	16	63	*	-	-	-	-	-	-	-	-	-	-																				

* TOO TURBID TO COUNT

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER NEAR

PONCA CITY, OKLAHOMA 1

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	16.0	–	8.3	–	–	–	–	–	106	120	190	15	950	75	.7	451	–
10	8	62	19.0	–	8.2	–	–	–	–	–	157	156	250	15	500	100	.8	561	–
10	15	62	23.0	–	8.5	–	–	–	–	–	238	196	316	10	210	120	1.0	822	–
10	22	62	15.0	–	8.4	–	–	–	–	–	260	208	320	10	143	135	.6	900	–
10	29	62	13.0	–	8.4	–	–	–	–	–	274	204	332	10	*25	140	1.0	900	–
11	5	62	8.0	–	8.4	–	–	–	–	–	286	216	328	5	*25	140	–	922	–
11	12	62	9.0	–	7.7	–	–	–	–	–	306	216	340	5	*25	145	1.1	990	–
11	19	62	7.0	–	8.2	–	–	–	–	–	312	216	348	0	*25	155	1.2	1000	–
11	26	62	9.0	–	8.4	–	–	–	–	–	255	218	330	5	*25	145	.9	970	–
12	3	62	13.0	–	8.2	–	–	–	–	–	210	206	340	5	*25	162	–	928	–
12	10	62	.2	–	8.1	–	–	–	–	–	280	218	328	5	*25	140	.8	980	–
12	17	62	.0	–	8.3	–	–	–	–	–	280	230	370	5	*25	150	1.4	1005	–
12	24	62	.0	–	8.3	–	–	–	–	–	310	218	368	–	*25	145	1.0	1032	–
1	7	63	.4	–	8.1	–	–	–	–	–	–	212	324	–	*25	115	1.0	830	–
1	14	63	.0	–	8.0	–	–	–	–	–	352	264	400	–	*25	150	1.2	1090	–
1	21	63	.1	–	8.0	–	–	–	–	–	364	266	412	–	*25	155	1.5	1125	–
1	28	63	.0	–	7.8	–	–	–	–	–	384	280	432	–	*25	170	1.7	1160	–
2	4	63	.1	–	7.8	–	–	–	–	–	310	230	370	–	*25	145	1.6	995	–
2	11	63	.0	–	8.2	–	–	–	–	–	236	192	260	5	160	125	.9	800	–
2	18	63	.4	–	8.2	–	–	–	–	–	304	220	368	5	95	185	1.3	1030	–
2	25	63	6.5	–	8.4	–	–	–	–	–	334	220	376	0	*25	190	1.1	1090	–
3	4	63	13.0	–	8.4	–	–	–	–	–	320	200	350	5	*25	160	.9	1090	–
3	11	63	8.0	–	7.9	–	–	–	–	–	200	180	270	5	500	110	.6	740	–
3	18	63	12.5	–	8.3	–	–	–	–	–	230	180	280	10	130	130	.8	790	–
3	25	63	15.5	–	8.4	–	–	–	–	–	290	180	330	5	*25	150	.9	990	–
4	1	63	17.0	–	8.4	–	–	–	–	–	300	164	300	5	*25	165	.3	970	–
4	8	63	16.0	–	8.4	–	–	–	–	–	270	148	290	5	*25	164	.5	970	–
4	15	63	17.0	–	8.4	–	–	–	–	–	300	112	308	5	*25	176	.4	1010	–
4	22	63	22.0	–	7.2	–	–	–	–	–	430	164	320	5	*25	176	.5	1100	–
4	29	63	19.0	–	8.3	–	–	–	–	–	370	168	330	5	*25	176	.6	1060	–
5	6	63	22.0	–	8.4	–	–	–	–	–	390	168	330	10	*25	164	.5	1050	–
5	13	63	23.0	–	8.4	–	–	–	–	–	380	172	330	5	*25	180	1.0	1190	–
5	20	63	18.0	–	8.4	–	–	–	–	–	410	184	330	5	*25	170	.9	1170	–
5	27	63	21.0	–	8.4	–	–	–	–	–	400	144	300	0	45	164	1.3	1120	–
6	3	63	24.0	–	8.2	–	–	–	–	–	180	142	196	20	1000	30	.3	530	–
6	10	63	26.0	–	8.3	–	–	–	–	–	190	142	200	20	300	76	.6	620	–
6	17	63	21.0	–	8.4	–	–	–	–	–	350	124	250	10	150	120	.8	920	–
6	24	63	24.0	–	8.4	–	–	–	–	–	230	148	260	20	200	96	.6	620	–

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER NEAR PONCA CITY, OKLAHOMA 1

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	1	63	25.5	-	8.4	-	-	-	-	-	250	170	300	25	550	120	1.2	800	-
7	8	63	29.0	-	8.4	-	-	-	-	-	320	166	290	10	200	136	.9	860	-
7	15	63	26.0	-	7.9	-	-	-	-	-	54	114	180	15	3000	46	.2	310	-
7	22	63	29.5	-	8.1	-	-	-	-	-	150	122	230	20	1000	64	.7	410	-
7	29	63	28.0	-	8.3	-	-	-	-	-	190	126	230	5	360	88	1.0	570	-
8	5	63	28.0	-	8.1	-	-	-	-	-	290	164	290	10	*25	130	1.0	880	-
8	12	63	27.5	-	8.4	-	-	-	-	-	390	164	300	15	*25	160	.5	1030	-
8	19	63	23.0	-	8.4	-	-	-	-	-	380	156	330	5	*25	150	.8	900	-
8	26	63	21.5	-	8.4	-	-	-	-	-	340	156	330	5	48	130	.9	850	-
9	3	63	25.5	-	8.4	-	-	-	-	-	430	120	350	5	65	164	.7	1110	-
9	9	63	27.0	-	7.9	-	-	-	-	-	130	98	160	0	1000	40	.4	310	-
9	16	63	21.0	-	8.1	-	-	-	-	-	160	144	180	10	700	52	.8	490	-
9	23	63	24.0	-	8.4	-	-	-	-	-	170	136	190	10	600	66	.9	480	-
9	30	63	17.5	-	7.5	-	-	-	-	-	290	184	260	5	69	104	1.1	810	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Ralston, Oklahoma
Operated by U.S. Geological Survey

STATE: Oklahoma

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Ark. River, Kans-Colo Line to Tulsa

STATION LOCATION: Arkansas River near Ponca City, Oklahoma

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	4.900	1.800	2.620	1.430	1.200	1.700	1.800	1.170	2.280	4.400	2.200	1.400
2	4.200	1.700	2.900	1.480	1.300	1.700	1.670	1.340	2.200	4.000	1.870	.802
3	4.100	1.780	2.800	1.540	1.400	1.700	1.610	1.400	2.540	3.600	1.720	.758
4	4.400	1.700	2.710	1.700	1.500	1.850	1.540	1.340	3.510	3.200	1.560	.846
5	4.200	1.610	2.900	2.360	1.600	1.980	1.520	1.270	4.080	2.710	1.400	1.880
6	4.200	1.580	2.710	2.360	1.700	2.200	1.540	1.180	2.620	2.450	1.260	12.300
7	4.000	1.540	2.540	2.450	1.750	2.280	1.520	1.120	2.200	2.280	1.150	16.400
8	3.800	1.490	2.280	2.540	1.870	2.280	1.480	1.100	2.360	2.080	1.040	12.200
9	3.700	1.460	2.200	3.000	1.950	2.450	1.400	1.150	2.450	1.800	.970	11.800
10	3.800	1.430	2.070	2.900	2.030	2.900	1.360	1.120	2.080	1.600	.920	9.550
11	3.700	1.420	1.800	2.450	2.120	3.400	1.340	1.010	1.920	1.740	.857	8.200
12	3.400	1.390	1.700	1.800	2.280	3.900	1.320	.960	1.750	4.490	.769	6.730
13	3.100	1.360	1.600	1.500	2.200	4.200	1.310	.920	1.600	18.300	.758	6.460
14	3.000	1.340	1.700	1.200	2.050	4.200	1.260	.920	1.450	14.400	.703	5.150
15	3.000	1.340	1.880	1.000	1.870	5.020	1.240	.846	1.310	8.850	.648	4.300
16	2.800	1.340	1.670	1.000	1.720	4.000	1.220	.802	1.300	11.400	.593	4.000
17	2.710	1.320	1.580	1.100	1.690	3.300	1.190	.940	1.300	11.400	.560	3.900
18	2.540	1.350	1.720	1.200	1.800	3.000	1.170	.868	1.260	7.180	.560	4.200
19	2.540	1.350	1.780	1.100	1.880	2.620	1.120	.769	1.540	4.300	.692	3.700
20	2.540	1.360	1.930	1.000	1.820	2.540	1.100	.725	2.200	3.700	.648	3.000
21	2.360	1.360	1.950	.950	1.750	2.360	1.100	.659	2.200	4.000	.648	2.900
22	2.200	1.380	1.900	.900	1.720	2.200	1.100	.659	1.900	4.200	.637	3.000
23	2.050	1.390	1.850	.900	1.720	2.200	1.050	.637	2.020	3.700	.758	2.800
24	1.980	1.400	1.850	.900	1.720	2.080	1.090	.615	2.360	3.400	.692	2.360
25	1.870	1.460	1.600	.900	1.670	1.970	1.110	.604	1.920	3.000	.604	2.200
26	1.780	1.560	1.500	.900	1.670	1.870	1.120	.659	1.780	2.620	.560	2.020
27	1.700	1.640	1.300	.900	1.700	1.820	1.170	.714	3.480	2.280	.549	1.880
28	1.690	1.720	1.300	.900	1.690	1.800	1.170	.703	4.900	2.120	.549	1.750
29	1.720	1.900	1.380	.950		1.780	1.160	3.810	5.020	3.000	.714	1.560
30	1.720	2.120	1.380	1.000		1.740	1.140	5.180	4.780	3.400	1.070	1.400
31	2.080		1.350	1.100		1.770		3.100		2.900	1.540	

ARKANSAS RIVER AT COOLIDGE, KANSAS

The Coolidge, Kansas station is located 1 1/2 miles downstream from the Colorado-Kansas State line. Samples are taken from the south bank, 50 feet below the U.S.G.S. gaging station.

Fifty miles upstream, John Martin Dam creates a storage reservoir for irrigation usage. At times, this reservoir has been completely drained in order to satisfy appropriations.

The nearest pollutional sources to the Coolidge station are Holly and Lamar, Colorado; six and thirty-four miles upstream, respectively. These two communities are below John Martin Dam and discharge a total BOD population equivalent of 5,800.

736-499 O - 64 - 5

Station Location:	Arkansas River at Coolidge, Kansas
Major Basin:	Southwest-Lower Mississippi River
Minor Basin:	Arkansas River, Kans.-Colorado Line to Tulsa
Station at:	38°02' Latitude 102°01' Longitude
Miles above mouth:	1,099
Activation Date:	March 24, 1958
Sampled by:	U.S. Geological Survey
Field Analysis by:	U.S. Public Health Service
Other Cooperating Agencies:	Kansas State Board of Health Colorado State Department of Public Health
Hydrologic Data:	
Nearest pertinent gaging station:	Near Coolidge, Kansas
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	25,410 square miles with 1,708 square miles probably noncontributing.
Period of record:	1950 to present
Average discharge in record period:	187 cfs.
Maximum discharge in record period:	60,000 cfs.
Minimum discharge in record period:	0 cfs.
Remarks:	Flows affected by storage, transmountain diversions, power, and irrigation usage.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.40	1.2
	Na	550	470
	K	16	12
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*80	*38
	Cd	*40	*38
	As	*400	*384
	B	360	538
	P	*100	*192
	Fe	170	77
	Mo	*40	*50
	Mn	–	*19
	Al	–	*192
	Be	*1	*1
	Cu	*40	*19
	Ag	*8	*10
	Ni	*40	*38
	Co	*80	*38
	Pb	*100	*96
	Cr	*20	*96
	V	*40	*192
	Ba	18	*8
	Sr	5000	2750

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.0	.2	April to June	6.6	1.0
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas [illegible] tographic analysis of the [illegible] of CCE, and may be assigned [illegible] units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values. See page 21.

RADIOACTIVITY DETERMINATIONS

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
					ALPHA						BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	10	22	0	5	14	26	14	26	0	26	82	45	82	52					
10	9	62	11	1	-	-	-	-	-	-	6	55	26	88	32	104					
10	14	62	11	16	-	-	-	-	-	-	7	6	319	136	326	136					
10	22	62	12	22	-	-	-	-	-	-	4	5	24	75	28	75					
10	29	62	11	17	-	-	-	-	-	-	11	6	26	90	37	90					
11	5	62	12	22	0	4	16	19	16	19	0	59	46	75	46	90					
11	12	62	11	30	-	-	-	-	-	-	60	58	10	83	70	101					
11	19	62	12	6	-	-	-	-	-	-	170	110	288	140	458	180					
11	26	62	12	18	2	5	39	24	41	25	42	62	142	95	184	113					
12	3	62	12	31	4	5	29	22	33	23	37	35	69	54	106	64					
12	10	62	1	3	-	-	-	-	-	-	30	66	51	97	81	117					
12	17	62	1	9	4	5	47	23	51	24	27	64	127	99	154	118					
12	24	62	1	9	-	-	-	-	-	-	57	69	141	99	198	121					
1	2	63	1	30	2	5	53	24	55	26	35	62	149	101	184	119					
1	7	63	1	18	0	8	58	29	66	30	5	63	148	95	153	114					
1	14	63	1	24	5	10	48	28	53	30	0	315	197	162	197	354					
1	21	63	2	8	0	5	72	34	72	34	0	49	117	86	117	99					
1	28	63	2	14	0	5	35	29	35	29	20	59	128	97	148	114					
2	4	63	2	18	4	6	22	21	26	22	29	31	69	45	98	55					
2	11	63	2	25	0	3	26	23	26	23	32	37	40	54	79	65					
2	19	63	3	7	3	6	32	24	35	25	37	62	37	88	74	108					
2	25	63	3	7	8	5	18	14	26	15	16	62	101	89	117	108					
3	4	62	3	20	4	5	28	21	32	22	35	58	59	87	94	105					
3	11	63	3	25	5	6	58	28	63	29	48	34	145	53	193	63					
3	18	63	4	1	2	2	40	26	42	26	23	8	75	45	98	46					
3	25	63	4	8	4	5	61	26	65	26	47	32	109	45	156	55					
4	2	63	4	18	1	1	29	20	30	20	29	13	113	143	142	144					
4	8	63	4	25	0	4	49	22	49	22	98	68	111	80	209	105					
4	15	63	4	29	1	6	13	21	14	22	2	28	87	46	89	54					
4	22	63	5	6	1	1	3	17	4	17	9	6	191	43	200	43					
4	29	63	5	15	0	3	39	20	39	20	32	55	66	83	98	100					
5	6	63	5	17	0	1	46	23	46	23	7	10	16	80	23	81					
5	13	63	5	27	0	1	15	19	15	19	2	6	84	46	86	46					
5	20	63	6	5	0	1	28	27	28	27	13	6	153	93	166	93					
5	27	63	6	12	1	1	12	20	13	20	22	14	140	96	162	97					
6	3	63	6	13	0	1	44	27	44	27	45	14	142	93	187	94					
6	10	63	6	25	2	5	34	22	36	23	0	228	90	86	90	244					
6	17	63	7	3	191	14	0	5	191	15	2933	153	189	55	3122	163					
6	24	63	7	10	40	25	15	17	55	30	604	103	183	83	787	132					

RADIOACTIVITY DETERMINATIONS

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

2

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
7	1	63	7	15	1	1	23	21	24	21	7	3	62	45	69	45						
7	8	63	7	24	0	0	34	24	34	24	4	5	134	145	138	145						
7	15	63	8	6	0	0	22	21	22	21	5	6	36	145	41	145						
7	22	63	8	7	0	1	11	22	11	22	8	7	161	96	169	96						
7	29	63	8	14	516	290	6	5	522	290	6297	738	123	20	6520	738						
8	5	63	8	21	0	1	46	29	46	29	0	29	110	96	110	100						
8	13	63	8	27	0	0	20	21	20	21	5	6	86	88	91	88						
8	21	63	9	6	90	45	24	19	114	49	771	129	94	85	865	154						
8	27	63	9	17	0	1	24	22	24	22	0	25	16	88	16	91						
9	3	63	9	17	27	26	17	16	44	31	421	108	29	81	450	135						
9	9	63	10	2	12	7	35	22	47	23	104	31	37	88	141	93						
9	16	63	10	2	32	26	11	19	43	32	291	152	64	84	355	174						

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

2

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	14	62	10	22	5241	193	21	172	0	8	4	0	1	3	0	2	2	0	5
11	5	62	11	12	4590	273	39	234	2	13	7	0	1	6	0	4	4	1	8
12	10	62	12	17	4622	258	21	237	1	7	6	0	0	6	0	2	1	0	4
1	7	63	2	1	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	11	63	2	19	5351	169	17	152	1	5	5	0	0	5	0	2	1	0	3
3	4	63	3	25	3144	377	49	328	-	-	-	-	-	-	-	-	-	-	-
4	2	63	4	22	3830	260	28	232	1	8	8	1	1	6	0	3	2	1	5
5	6	63	5	16	1683#	374	53	321	-	-	-	-	-	-	-	-	-	-	-
6	3	63	7	1	2225#	382	115	267	24	27	19	1	1	17	0	11	12	1	21
7	1	63	7	15	5626#	184	48	136	-	-	-	-	-	-	-	-	-	-	-
7	17	63	7	29	1930	334	95	239	7	34	17	1	1	14	1	9	5	2	21
8	13	63	8	21	270*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* FLOW UNKNOWN
\# ESTIMATED
* LOW FLOW

PLANKTON POPULATION

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

002

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	ROTIFERS NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		CRUSTACEA NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	5	16	75	12	92	11	67	7	54	10	0	32	13	3									4	52	1					0	0
10	14	62	4	11	2	10	71	9	75	9	61	0	0	0											0							0	0
11	5	62	87	21	69	16	75	12	92	8	43	-	-	0											0							0	0
11	19	62	87	28	5	10	71	9	92	8	45	-	-	-											-							-	-
12	3	62	92	38	87	29	12	6	75	4	23	-	-	0											0							0	0
12	10	62	87	37	92	29	75	6	12	3	25	-	-	-											-							-	-
1	2	63	92	50	71	11	38	8	2	3	28	-	-	0											0							0	0
1	21	63	92	15	86	10	2	9	26	5	61	-	-	0											0							0	0
2	4	63	92	29	34	19	71	4	5	4	44	-	-	0											0							0	0
2	19	63	51	23	31	20	92	14	2	10	33	-	-	0											0							0	0
3	4	63	92	31	12	18	13	13	87	9	29	-	-	0											0							0	0
3	18	63	92	32	87	12	12	9	71	8	39	-	-	0											0							0	0
4	2	63	92	23	71	11	72	9	86	6	51	-	-	-											0							0	0
4	15	63	92	33	12	15	71	10	87	5	37	-	-	0											-							-	-
5	6	63	67	66	70	8	2	6	82	5	15	-	-	1											0							0	0
5	20	63	92	80	34	3	2	3	4	3	11	-	-	0											0							0	0
6	3	63	71	43	92	19	75	7	97	3	28	-	-	0											0							0	1
6	17	63										-	-	-											0							0	0
7	1	63										-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63	67	66	26	17	70	5	70	5	17	-	-	-											-							-	-
8	21	63										-	-	8	22	1									0							0	0
9	3	63										-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE KANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

2

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	1000	0	10	10	10	10	0	70	860	0	500	74	1																	
10	14	62	2300	0	0	0	0	0	0	70	2250	20	990	88	2	74	2	67	1	73	1	89	1	92	1	75	1					
11	5	62	2400	0	0	0	0	40	0	40	2280	0	250	88	2	91	2	89	1	92	1											
11	19	62	3000	70	50	90	0	20	0	250	2570	70	3110	91	3	88	2	74	1	87	1	92	1	89	1	68	1					
12	3	62	10000	0	0	0	0	60	0	80	9810	0	500	92	5	91	5	88	3	78	3	87	2	89	2							
12	10	62	5300	0	0	40	0	0	0	0	5260	0	540	91	4	92	4	88	2	89	1	87	1	78	1							
1	2	63	900	0	20	70	0	0	130	0	640	40	1080	92	2																	
1	21	63	300	0	0	0	0	20	0	20	290	20	510																			
2	4	63	600	0	0	0	0	90	0	20	440	20	1690																			
2	19	63	500	0	0	0	0	60	110	0	380	40	1640	81	1																	
3	4	63	500	0	0	0	0	0	40	0	440	0	660																			
3	18	63	1300	0	0	0	0	40	40	0	1210	0	1540	92	2	91	1	88	1	78	1											
4	2	63	1000	0	0	0	0	40	0	0	990	0	460	92	1	88	1															
4	15	63	300	0	0	0	0	20	0	0	240	0	550																			
5	6	63	700	0	0	0	0	0	0	200	530	40	130	88	2																	
5	20	63	700	0	0	0	0	0	0	40	620	0	70	92	2																	
6	3	63	3500	40	0	70	0	20	0	90	3230	0	920	88	4	92	2	90	1													
6	17	63	*	-	-	-	-	-	-	-	-	-	-																			
7	1	63	2600	0	0	40	0	0	0	150	2420	20	680																			
7	15	63	1300	40	0	40	0	0	0	150	1120	60	370																			
8	5	63	2100	0	0	80	0	40	0	230	1740	20	290	88	4	68	1															
8	21	63	*	-	-	-	-	-	-	-	-	-	-																			
9	3	63	*	-	-	-	-	-	-	-	-	-	-																			
9	16	63	*	-	-	-	-	-	-	-	-	-	-																			

* TOO TURBID TO COUNT

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS

2

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (cobalt units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	-	-	-	-	-	-	-	-	166	188	1630	0	*25	2400	.0	4100	-
10	8	62	-	-	8.0	-	-	-	-	-	176	170	1470	0	*25	2250	.0	4030	-
10	14	62	-	-	7.8	-	-	-	-	-	168	188	1580	0	*25	2400	.0	4170	-
10	22	62	-	-	-	-	-	-	-	-	158	180	1560	0	*25	2300	.0	4070	-
10	29	62	-	-	-	-	-	-	-	-	168	200	1560	0	*25	2300	.0	4043	-
11	5	62	-	-	8.0	-	-	-	-	-	204	186	1540	0	*25	2200	.0	4060	-
11	12	62	-	-	8.0	-	-	-	-	-	198	196	1560	5	*25	2200	.0	-	-
11	19	62	-	-	8.0	-	-	-	-	-	156	216	1550	0	240	2300	.0	3980	-
11	26	62	-	-	7.9	-	-	-	-	-	147	190	1570	0	130	2300	.0	4000	-
12	3	62	-	-	8.0	-	-	-	-	-	126	150	1540	0	140	2100	.0	3930	-
12	10	62	-	-	8.1	-	-	-	-	-	100	182	1440	0	120	2200	.0	3900	-
12	17	62	-	-	8.0	-	-	-	-	-	150	204	1570	5	*25	2150	.0	3840	-
12	24	62	-	-	7.9	-	-	-	-	-	152	204	1740	-	145	2400	.0	4170	-
1	2	63	-	-	7.9	-	-	-	-	-	-	228	1700	-	*25	2300	.0	3970	-
1	7	63	-	-	8.0	-	-	-	-	-	160	216	1490	-	*25	2000	.0	3840	-
1	14	63	-	-	7.8	-	-	-	-	-	196	280	1890	-	*25	2800	.0	3835	-
1	21	63	-	-	7.9	-	-	-	-	-	156	236	1630	-	*25	3100	.0	4102	-
1	28	63	-	-	7.9	-	-	-	-	-	160	250	1700	-	*25	2400	.1	4300	-
2	4	63	-	-	7.9	-	-	-	-	-	120	210	1500	-	230	2100	.0	3600	-
2	11	63	-	-	7.7	-	-	-	-	-	130	208	1540	5	*25	2200	.0	3730	-
2	19	63	-	-	7.8	-	-	-	-	-	132	220	1460	0	140	2050	.0	3850	-
2	25	63	-	-	7.8	-	-	-	-	-	134	220	1530	0	100	2200	.0	3850	-
3	4	63	-	-	7.5	-	-	-	-	-	134	200	1570	5	*25	2350	.0	4000	-
3	11	63	-	-	7.9	-	-	-	-	-	140	210	1560	0	*25	2200	.0	4000	-
3	18	63	-	-	7.4	-	-	-	-	-	144	210	1610	0	110	2200	.0	4140	-
3	25	63	-	-	7.5	-	-	-	-	-	152	200	1640	0	110	2400	.0	4170	-
4	2	63	-	-	7.5	-	-	-	-	-	155	196	1700	0	97	2400	.0	4100	-
4	8	63	-	-	8.0	-	-	-	-	-	90	188	1400	5	400	1840	.0	3300	-
4	15	63	-	-	7.2	-	-	-	-	-	140	212	1650	5	35	2300	.0	3900	-
4	22	63	-	-	7.4	-	-	-	-	-	175	200	1650	5	*25	2300	.0	4100	-
4	29	63	-	-	-	-	-	-	-	-	165	192	1850	0	*25	2500	.0	4200	-
5	6	63	-	-	-	-	-	-	-	-	190	140	1950	5	*25	2400	.0	4000	-
5	13	63	-	-	-	-	-	-	-	-	165	180	1750	0	*25	2400	.0	4100	-
5	20	63	-	-	-	-	-	-	-	-	180	168	1600	5	*25	2350	.0	4200	-
5	27	63	-	-	-	-	-	-	-	-	135	160	1800	5	*25	2350	.0	4100	-
6	3	63	-	-	-	-	-	-	-	-	150	188	1600	5	*25	2200	.0	3900	-
6	10	63	-	-	-	-	-	-	-	-	155	162	1800	0	*25	2500	.0	4200	-
6	17	63	-	-	-	-	-	-	-	-	75	160	850	25	3000	840	.0	1560	-
6	24	63	-	-	-	-	-	-	-	-	100	132	1200	15	1400	1460	.0	2800	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE KANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN ARK. RIVER, KANS-COLO LINE TO TULSA

STATION LOCATION ARKANSAS RIVER AT COOLIDGE, KANSAS 2

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	1	63	-	-	-	-	-	-	-	-	170	178	1800	5	*25	2400	.0	4100	-
7	8	63	-	-	-	-	-	-	-	-	195	166	1700	5	*25	2350	.0	4100	-
7	15	63	-	-	-	-	-	-	-	-	185	160	1650	5	*25	2800	.0	4200	-
7	22	63	-	-	-	-	-	-	-	-	210	158	1900	0	*25	2600	.0	4400	-
7	29	63	-	-	-	-	-	-	-	-	35	132	600	15	5000	340	.0	730	-
8	5	63	-	-	-	-	-	-	-	-	180	162	1650	5	*25	2400	.0	4100	-
8	13	63	-	-	-	-	-	-	-	-	190	180	1700	5	*25	2400	.0	4000	-
8	21	63	-	-	-	-	-	-	-	-	135	202	1350	5	3000	2000	.0	3270	-
8	27	63	-	-	-	-	-	-	-	-	180	146	1700	0	*25	2400	.0	3740	-
9	3	63	-	-	-	-	-	-	-	-	95	160	1250	8	2000	1600	.0	2600	-
9	9	63	-	-	-	-	-	-	-	-	160	200	1900	5	1000	2500	.0	4300	-
9	16	63	-	-	-	-	-	-	-	-	145	210	1450	10	1500	2000	.0	3400	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Coolidge, Kansas
Operated by U.S. Geological Survey

STATE: Kansas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Ark. River, Kans-Colo Line to Tulsa

STATION LOCATION: Arkansas River at Coolidge, Kansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.016	.028	.091	.115	.165	.144	.060	.027	.095	.032	.034	.013
2	.014	.026	.102	.125	.160	.140	.032	.010	.042	.031	.024	.055
3	.0083	.024	.106	.132	.150	.136	.178	.0088	.034	.029	.0061	.021
4	.0094	.028	.129	.140	.193	.144	.360	.0066	.026	.031	.0040	.0053
5	.010	.027	.114	.148	.186	.159	.360	.0061	.022	.024	.0030	.0032
6	.010	.026	.110	.144	.174	.167	.355	.0088	.019	.0094	.0032	.0032
7	.0094	.024	.110	.144	.178	.167	.377	.010	.018	.0066	.0025	.0038
8	.0083	.023	.121	.163	.174	.144	.394	.0083	.018	.0050	.0018	.067
9	.0066	.026	.121	.159	.171	.125	.382	.0083	.017	.0047	.0042	.032
10	.0061	.027	.117	.110	.163	.133	.372	.0061	.016	.0043	.0040	.025
11	.0094	.042	.125	.062	.155	.133	.355	.0061	.010	.0040	.0035	.014
12	.014	.045	.125	.068	.140	.136	.350	.0056	.0040	.0050	.0038	.014
13	.012	.045	.125	.071	.145	.133	.366	.0061	.0027	.0037	.0042	.030
14	.013	.045	.133	.074	.150	.125	.285	.0066	.0030	.0034	.0032	.038
15	.014	.040	.136	.077	.160	.121	.163	.0056	.0050	.0030	.0020	.032
16	.014	.031	.133	.079	.163	.129	.110	.0050	.290	.0020	.0020	.028
17	.019	.036	.140	.080	.163	.129	.091	.0056	.400	.0017	.0035	.014
18	.024	.040	.140	.083	.163	.136	.070	.0043	.236	.0030	.033	.0057
19	.022	.070	.129	.062	.152	.133	.063	.0056	.133	.0017	.073	.0030
20	.017	.102	.133	.066	.152	.125	.067	.0047	.063	.0014	.030	.0028
21	.023	.098	.129	.070	.155	.110	.060	.0040	.053	.0010	.046	.0081
22	.027	.087	.114	.067	.163	.106	.053	.0056	.548	.0005	.046	.016
23	.027	.091	.102	.064	.155	.102	.053	.0056	.280	.0005	.021	.012
24	.034	.077	.064	.070	.155	.095	.053	.0040	.193	.0015	.0061	.084
25	.036	.084	.060	.066	.155	.091	.051	.0037	.148	.0056	.0045	.236
26	.031	.084	.064	.068	.148	.084	.042	.0030	.098	.0020	.0035	.365
27	.022	.084	.076	.070	.144	.087	.036	.0050	.063	.0040	.0042	.359
28	.026	.098	.086	.072	.144	.073	.038	.0040	.049	.986	.012	.220
29	.026	.102	.098	.066		.060	.034	.0061	.042	.413	.022	.107
30	.026	.095	.104	.071		.053	.032	.0047	.038	.168	.021	.079
31	.028		.110	.084		.070		.0040		.057	.016	

MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA

This station is the lowermost Pollution Surveillance System station on the Mississippi River. Samples are taken at the municipal water treatment plant intake.

Twenty miles upstream, primary sewage treatment plant effluent from a population of approximately 194,000 and wastes from petrochemical industries at Baton Rouge are discharged to the river. The river is navigable to ocean-going vessels upstream as far as Baton Rouge.

Municipal water supplies in the area include New Orleans, Westwego, Gretna and Algiers, Louisiana, and Jefferson Parish.

During August and September the chlorinated hydrocarbon insecticides, endrin and dieldrin, were detected in carbon filter samples from this station. (See page 68.)

Station Location: Mississippi River at New Orleans, Louisiana

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Mississippi-Natchez to Gulf

Station at: 29°58' Latitude 90°08' Longitude

Miles above mouth: 105

Activation Date: December 12, 1957

Sampled by: New Orleans Sewage and Water Board

Field Analysis by: Louisiana State Department of Health

Other Cooperating Agencies: None

Hydrologic Data:

Nearest pertinent gaging station: At Red River Landing, La.

Gaging station operated by: U.S. Army Corps of Engineers

Drainage area at gaging station: 1,243,000 square miles

Period of record: 1935 to 1961

Average discharge in record period: 468,000 cfs.

Maximum discharge in record period: –

Minimum discharge in record period: –

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-7-63	0.16
3-14-63	0.03
3-21-63	0.05
3-28-63	0.04
4-4-63	0.04
4-11-63	0.04
4-18-63	0.03
4-22-63	0.04
5-16-63	0.05
5-30-63	0.05
6-6-63	0.06
6-13-63	0.05
6-20-63	0.06
6-27-63	0.08
7-3-63	0.05
7-11-63	0.03
7-18-63	0.06
7-25-63	0.06
8-8-63	0.06
8-15-63	0.09
8-22-63	0.07
8-29-63	0.03
9-5-63	0.07
9-12-63	0.06
9-26-63	0.08

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.23	.25
	Na	26	14
	K	3.7	3.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	9	6
	Cd	*2	*2
	As	*25	*22
	B	36	40
	P	*12	19
	Fe	59	17
	Mo	20	16
	Mn	.6	*1.1
	Al	–	16
	Be	*.06	*.06
	Cu	2	5
	Ag	*.5	*.6
	Ni	*1	*2
	Co	*5	*2
	Pb	*12	*6
	Cr	*1	*6
	V	*2	*11
	Ba	37	57
	Sr	133	123

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.9	.4	April to June	–	–
January to March	–	–	July to September	4.5	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
8/5 - 8/8/63	Indrin	.074
8/5 - 8/8/63	Dieldrin	.013
9/6 - 9/12/63	Indrin	.062
9/6 - 9/12/63	Dieldrin	.032
9/13 - 9/20/63	Indrin	.083
9/13 - 9/20/63	Dieldrin	.024

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-NATCHEZ TO GULF

STATION LOCATION MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA 20

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR.	MO. DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	3	62	11 27	-	-	-	-	- -	15	13	18	8	33	15					
10	11	62	11 7	-	-	-	-	- -	4	11	22	8	26	14					
10	18	62	11 20	0	2	2	2	2 3	33	29	33	9	66	30					
10	25	62	11 16	-	-	-	-	- -	3	7	17	8	20	11					
11	29	62	12 21*	1	1	0	2	4 2	10	7	31	9	41	11					
12	27	62	1 18*	0	1	1	1	1 1	22	7	25	9	47	11					
1	31	63	2 8*	2	1	1	1	3 1	4	7	21	9	25	11					
2	28	63	3 11*	0	1	0	1	0 1	19	6	22	6	41	8					
3	28	63	4 17*	6	5	0	1	6 5	69	20	25	8	94	22					
4	29	63	5 17*	2	3	0	1	2 3	58	18	35	8	93	20					
5	30	63	6 17*	1	1	0	1	1 1	20	7	38	4	58	8					
6	27	63	7 17*	1	1	1	1	2 1	33	12	29	8	62	14					
7	25	63	9 9*	0	1	1	1	1 1	8	3	32	5	40	6					
8	29	63	9 23*	0	1	3	2	3 2	2	3	33	5	35	6					
9	26	63	10 23*	0	1	2	2	2 2	1	4	25	6	25	7					

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-NATCHEZ TO GULF

STATION LOCATION MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA 020

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS										CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	20	32	56	14	58	10	26	9	35	-	-	0											0							0	0
10	15	62	56	20	26	18	80	15	82	12	35	-	-	14	2	1	17	1							0							0	0
11	6	62	58	37	97	25	26	6	82	6	26	-	-	18	22	1	17	1							0							0	0
11	19	62	80	46	56	24	58	9	26	8	13	-	-	0											0							0	0
12	3	62										30	-	28	11	3									0							0	0
12	17	62	82	33	57	31	56	7	91	7	22	90	-	0											0							0	0
1	7	63	80	68	82	22	57	8	56	1	1	-	-	49	2	3	11	2							0							0	0
1	21	63	80	39	82	34	56	7	57	4	16	-	-	1											1							0	0
2	4	63	80	59	82	29	57	3	27	2	7	-	-	0											0							0	0
2	18	63	82	55	80	21	57	7	9	4	13	-	-	2											1							1	0
3	4	63	57	26	80	22	56	21	82	8	23	-	-	1											0							0	0
3	18	63	61	35	80	14	92	9	36	8	34	-	-	0											0							0	0
4	1	63										-	-	0											0							0	0
4	15	63	80	33	92	13	56	12	20	7	35	-	-	1											0							0	0
5	6	63	82	43	80	21	57	11	9	4	21	-	-	33	11	3	17	1							2							0	0
5	20	63	80	52	82	24	56	9	57	3	12	-	-	45	11	3									1							0	0
6	3	63	82	70	57	13	56	4	26	3	10	-	-	0											0							0	0
6	17	63	80	32	56	18	82	9	47	8	33	-	-	0											0							0	0
7	1	63	57	24	82	13	56	12	26	10	41	-	-	0											0							0	0
7	15	63	57	36	82	16	58	14	56	13	21	-	-	4											1							0	0
8	5	63	56	34	58	29	26	15	57	5	17	-	-	1											1							0	0
8	19	63	20	43	26	25	56	18	58	10	4	-	-	3											0							0	0
9	2	63	56	80	58	5	26	4	82	2	9	-	-	68	17	3	22	2	2	1	11	1			15	50	3	51	1			0	0
9	16	63	56	52	26	35	58	5	82	2	6	-	-	-											-							-	-

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-NATCHEZ TO GULF

STATION LOCATION MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA 20

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	2600	0	40	290	0	0	0	1270	1010	680	550	69	2	67	2	92	2	88	1	71	1									
10	15	62	600	0	0	40	0	0	0	350	170	170	120																			
11	6	62	600	10	0	100	0	20	70	350	80	360	100	69	1																	
11	19	62	800	20	0	80	0	30	0	590	80	210	30	71	2	69	1															
12	3	62	600	0	0	70	0	70	0	430	0	340	70																			
12	17	62	1500	0	70	110	0	70	0	1140	70	730	20	71	3	69	2															
1	7	63	900	0	20	50	0	30	0	700	90	330	20	69	1																	
1	21	63	1300	0	40	40	0	20	0	860	290	230	0	71	3																	
2	4	63	1000	0	80	20	0	40	0	740	110	570	20	68	3																	
2	18	63	1600	0	0	0	0	40	110	1320	110	1910	150	71	3																	
3	4	63	1100	0	0	0	0	40	70	810	180	510	110	71	2	69	2															
3	18	63	1400	0	0	0	0	40	40	1210	130	370	220	69	2	71	2															
4	1	63	200	0	0	20	0	40	0	130	20	200	110																			
4	15	63	300	0	20	30	0	20	0	240	20	50	50																			
5	6	63	400	0	0	20	0	0	0	330	40	700	20	71	1																	
5	20	63	800	20	0	70	0	20	0	660	40	920	220	71	2	69	1															
6	3	63	1100	0	0	200	0	20	0	790	90	1760	310	71	2	69	1															
6	17	63	700	0	0	150	0	0	0	290	240	530	310																			
7	1	63	500	0	0	20	0	0	0	380	90	180	140	69	1																	
7	15	63	600	0	0	40	0	60	0	520	0	150	0	71	2	68	1															
8	5	63	700	0	0	100	20	20	20	460	60	250	100	68	2																	
8	19	63	1600	30	0	150	0	70	0	1260	50	420	50	67	3	68	2															
9	2	63	400	0	0	200	0	0	0	190	40	300	20																			
9	16	63	600	20	20	200	0	90	0	220	50	250	50																			

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-NATCHEZ TO GULF

STATION LOCATION MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA

DATE OF SAMPLE BEGINNING MONTH	BEGINNING DAY	BEGINNING YEAR	END MONTH	END DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	EXTRACTABLES CHLORO-FORM	EXTRACTABLES ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	CHLOROFORM EXTRACTABLES WATER SOLUBLES	CHLOROFORM EXTRACTABLES NEUTRALS TOTAL	NEUTRALS ALIPHATICS	NEUTRALS AROMATICS	NEUTRALS OXYGEN-ATED COMPOUNDS	NEUTRALS LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	23	62	10	31	6670#	107	23	84	0	4	10	0	1	8	1	3	1	1	4
11	19	62	11	27	6746	133	35	98	0	9	13	1	1	11	0	5	3	1	4
12	18	62	12	25	6440	137	33	104	1	7	15	1	2	12	0	4	2	1	3
1	10	63	1	31	6479	134	38	96	-	-	-	-	-	-	-	-	-	-	-
2	1	63	2	9	6440	129	46	83	4	7	22	1	3	16	2	6	3	0	4
2	18	63	3	5	7360	130	58	72	-	-	-	-	-	-	-	-	-	-	-
3	6	63	3	13	6440	147	54	93	2	14	21	1	2	17	1	6	4	1	6
3	26	63	4	2	6440	132	44	88	-	-	-	-	-	-	-	-	-	-	-
4	3	63	4	15	6500	115	32	83	1	6	15	2	2	10	1	4	2	1	3
4	23	63	4	30	6100	95	38	57	-	-	-	-	-	-	-	-	-	-	-
5	8	63	5	19	5878#	132	64	68	-	-	-	-	-	-	-	-	-	-	-
5	20	63	5	25	6552	76	35	41	2	8	10	0	1	8	1	4	3	1	7
6	5	63	6	12	6544	109	53	56	-	-	-	-	-	-	-	-	-	-	-
6	14	63	6	25	5215	127	39	88	1	9	12	0	1	10	1	5	3	1	8
6	27	63	7	2	4603	148	86	62	-	-	-	-	-	-	-	-	-	-	-
7	11	63	7	16	9659	79	34	45	0	9	12	0	1	10	1	5	3	1	4
8	1	63	8	5	5102	94	27	67	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	8	5340	103	31	72	1	10	10	0	1	9	0	4	3	1	2
8	22	63	8	28	5019	139	50	89	-	-	-	-	-	-	-	-	-	-	-
9	6	63	9	12	5096	113	37	76	0	10	14	1	2	10	1	5	3	1	4
9	13	63	9	20	5005	110	31	79	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE: LOUISIANA
MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN: LOWER MISSISSIPPI-NATCHEZ TO GULF
STATION LOCATION: MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	4	62	21.1	6.3	6.7	.5	14	1.0	3.9	.5	25	116	151	15	100	60	.2	255	3000
10	11	62	21.1	6.4	7.6	.2	11	.8	3.7	.2	28	126	159	25	85	83	.2	307	6000
10	18	62	20.0	7.3	7.5	1.1	12	1.0	2.8	.4	38	133	172	25	85	74	.2	305	730
10	24	62	19.4	7.8	7.6	.6	10	.8	3.7	.3	37	120	161	15	115	66	.2	251	-
10	25	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
10	31	62	17.8	8.3	7.8	1.2	10	.0	3.6	.3	32	122	161	25	90	66	.2	255	-
11	8	62	14.4	8.6	7.9	1.2	95	1.2	3.8	.4	26	121	155	25	68	61	.1	261	1200
11	15	62	15.0	9.2	7.8	.7	9	1.6	3.8	.3	30	132	170	25	35	55	.2	262	500
11	21	62	11.7	8.6	7.9	.9	18	1.2	3.8	.3	30	129	168	15	68	71	.2	306	-
11	29	62	9.4	8.3	7.8	.8	16	1.2	2.9	.4	41	120	174	20	78	77	.2	342	1400
12	6	62	8.9	9.7	7.8	2.4	18	1.6	4.0	.5	42	111	180	15	78	91	.1	322	1200
12	13	62	8.9	9.2	8.0	1.2	17	1.7	4.7	.3	31	106	159	20	63	74	.1	284	1600
12	20	62	6.7	10.8	7.9	2.6	23	1.7	3.9	.7	37	113	163	20	68	60	.1	284	20000
12	27	62	5.0	11.7	8.1	2.8	20	1.8	4.5	.4	39	129	172	15	26	66	.1	297	-
1	3	63	5.0	11.1	7.8	2.5	17	1.8	4.8	.4	38	140	176	10	41	51	.2	284	-
1	10	63	3.3	11.2	7.7	2.4	15	1.8	4.7	.7	30	113	149	15	108	56	.1	254	3300
1	17	63	2.8	12.1	2.0	2.4	11	.8	6.3	.4	38	101	149	20	73	52	.1	270	1000
1	24	63	2.2	11.2	7.7	1.6	15	3.8	7.1	.6	33	100	138	15	103	51	.1	240	1900
1	31	63	2.2	12.5	7.7	3.1	25	.6	7.2	.6	34	113	152	20	108	54	.2	267	1000
2	7	63	3.3	13.1	7.6	2.7	11	.7	6.4	.7	29	96	138	15	48	59	.1	232	600
2	14	63	3.9	12.6	7.8	2.7	18	.5	6.3	.9	32	110	147	30	38	59	.1	250	670
2	21	63	4.4	11.7	7.8	2.6	11	.9	6.0	.5	30	113	145	35	32	50	.1	254	100
2	26	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40000
2	28	63	4.4	12.1	7.6	2.5	18	.4	7.0	.7	29	99	140	15	64	62	.1	224	-
3	7	63	6.7	11.7	7.6	2.3	14	.6	7.3	.6	35	112	154	40	48	64	.2	220	500
3	14	63	10.0	10.7	7.8	2.2	17	.8	7.3	.6	32	107	142	50	115	57	.2	243	500
3	21	63	10.0	7.7	7.7	2.6	47	.5	7.3	.3	23	90	116	50	520	42	.1	200	3100
3	28	63	12.8	8.9	7.8	1.5	26	.7	8.9	.4	18	74	112	30	288	34	.1	209	1700
4	4	63	15.6	8.5	7.5	1.6	24	2.9	6.8	.8	16	71	105	40	230	32	.1	181	1400
4	11	63	15.0	8.0	7.6	.4	20	2.2	6.6	.4	24	71	105	50	190	48	.1	180	1000
4	18	63	17.2	7.8	7.5	1.0	21	1.8	6.4	.4	19	81	122	30	170	47	.1	204	3000
4	25	63	18.9	7.6	7.9	.8	25	1.9	5.7	.5	20	93	129	25	145	49	.1	243	1000
5	2	63	19.4	7.7	8.0	.9	16	1.4	3.9	.2	24	102	146	20	73	51	.1	213	1500
5	9	63	21.1	7.4	8.0	.4	18	1.4	4.0	.5	24	123	168	30	45	63	.1	253	1000
5	16	63	22.5	7.1	7.9	.4	18	1.0	4.0	.5	24	88	129	30	103	50	.1	273	1000
5	23	63	23.9	7.2	8.0	.9	32	1.6	4.1	.5	26	111	158	30	68	63	.2	148	1800
5	30	63	25.6	6.9	7.9	.2	14	1.3	3.7	.5	26	124	177	20	78	77	.1	294	1700
6	6	63	23.3	7.0	7.8	.6	21	1.7	5.1	.4	26	118	170	25	218	70	.1	275	45000
6	13	63	25.6	5.6	7.8	.6	18	1.6	4.9	.4	23	105	141	30	133	57	.1	227	930

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CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-NATCHEZ TO GULF

STATION LOCATION MISSISSIPPI RIVER AT NEW ORLEANS, LOUISIANA 20

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	20	63	-	6.0	7.9	2.0	14	1.0	4.0	.4	26	112	153	25	73	55	.2	257	1700
6	27	63	27.2	6.2	8.0	1.0	12	1.5	3.8	.2	29	110	160	30	50	66	.2	265	-
7	3	63	28.3	5.2	7.8	1.3	14	1.2	3.6	.4	29	107	156	20	73	67	.2	255	-
7	11	63	28.3	6.2	7.9	.1	13	1.2	3.6	.3	33	119	168	20	63	64	.2	272	1600
7	18	63	32.2	4.7	7.6	.7	18	1.3	3.8	.3	68	126	179	25	36	67	.2	369	25000
7	25	63	30.0	6.7	7.8	.7	14	1.4	3.6	.4	49	127	170	25	90	59	.2	311	500
8	1	63	28.9	4.1	7.9	1.3	7	1.3	3.5	.5	40	116	158	25	78	62	.2	281	600
8	8	63	29.4	5.3	7.9	.5	11	1.2	3.1	.5	36	109	153	25	36	68	.2	272	930
8	15	63	30.0	5.5	7.8	1.1	6	1.1	3.2	.4	31	114	153	20	22	59	.2	251	800
8	22	63	30.0	5.6	7.8	1.6	-	1.4	3.6	.3	39	124	167	30	6	69	.1	295	2500
8	29	63	30.0	5.5	8.0	1.0	10	1.7	4.1	.5	35	123	167	30	3	75	.1	302	2000
9	5	63	30.0	5.5	8.0	1.5	10	1.6	3.9	.5	30	120	167	25	9	59	.2	301	4300
9	12	63	33.3	6.0	7.9	1.7	12	1.3	3.4	.5	32	123	172	10	*25	67	.3	287	6000
9	19	63	28.9	6.2	8.2	.5	11	.9	2.7	.5	35	115	167	15	*25	65	.2	307	1500
9	26	63	26.1	5.3	8.0	.0	12	.9	2.4	.7	35	118	167	20	*25	56	.2	286	-
9	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Red River Landing, Louisiana
Operated by U.S. Geological Survey

STATE: Louisiana

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Mississippi-Natchez to Gulf

STATION LOCATION: Mississippi River at New Orleans, Louisiana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	218.000	212.000	254.000	215.000	223.000	217.000	864.000	245.000	309.000	239.000	232.000	164.000
2	212.000	209.000	260.000	224.000	208.000	216.000	871.000	248.000	305.000	236.000	229.000	164.000
3	212.000	204.000	268.000	237.000	196.000	216.000	876.000	255.000	305.000	231.000	220.000	157.000
4	214.000	203.000	272.000	256.000	186.000	223.000	879.000	273.000	314.000	228.000	214.000	157.000
5	214.000	201.000	274.000	275.000	183.000	226.000	881.000	288.000	319.000	225.000	209.000	160.000
6	214.000	201.000	275.000	285.000	180.000	231.000	882.000	309.000	320.000	221.000	205.000	164.000
7	216.000	201.000	277.000	283.000	177.000	237.000	875.000	333.000	318.000	220.000	200.000	167.000
8	218.000	201.000	275.000	280.000	176.000	242.000	862.000	358.000	309.000	220.000	203.000	168.000
9	221.000	199.000	264.000	276.000	179.000	250.000	849.000	376.000	301.000	218.000	205.000	162.000
10	228.000	196.000	245.000	273.000	179.000	260.000	849.000	378.000	292.000	216.000	199.000	158.000
11	239.000	193.000	230.000	274.000	185.000	280.000	840.000	371.000	283.000	216.000	199.000	156.000
12	249.000	188.000	218.000	276.000	188.000	343.000	832.000	362.000	274.000	216.000	201.000	156.000
13	253.000	186.000	204.000	274.000	192.000	431.000	823.000	349.000	266.000	210.000	199.000	156.000
14	256.000	186.000	195.000	269.000	209.000	506.000	811.000	334.000	257.000	200.000	201.000	154.000
15	253.000	186.000	196.000	255.000	228.000	564.000	789.000	319.000	253.000	198.000	201.000	150.000
16	245.000	181.000	198.000	238.000	243.000	611.000	754.000	309.000	251.000	197.000	193.000	148.000
17	237.000	181.000	198.000	223.000	258.000	649.000	713.000	298.000	255.000	197.000	192.000	147.000
18	234.000	184.000	196.000	219.000	269.000	676.000	664.000	288.000	259.000	197.000	191.000	150.000
19	228.000	188.000	192.000	219.000	281.000	698.000	595.000	278.000	264.000	197.000	190.000	151.000
20	230.000	209.000	182.000	244.000	289.000	707.000	550.000	270.000	268.000	197.000	187.000	151.000
21	237.000	234.000	176.000	236.000	288.000	724.000	491.000	264.000	271.000	199.000	185.000	156.000
22	239.000	247.000	167.000	236.000	283.000	745.000	431.000	260.000	271.000	205.000	180.000	156.000
23	236.000	258.000	160.000	242.000	278.000	770.000	392.000	258.000	271.000	206.000	171.000	156.000
24	236.000	268.000	156.000	247.000	275.000	779.000	356.000	260.000	268.000	208.000	163.000	153.000
25	239.000	272.000	155.000	255.000	269.000	793.000	319.000	265.000	264.000	210.000	158.000	151.000
26	243.000	272.000	154.000	266.000	254.000	806.000	292.000	276.000	254.000	213.000	157.000	146.000
27	241.000	272.000	157.000	274.000	235.000	818.000	271.000	286.000	243.000	215.000	157.000	144.000
28	234.000	270.000	161.000	273.000	225.000	831.000	257.000	298.000	238.000	223.000	157.000	144.000
29	226.000	262.000	172.000	263.000		840.000	250.000	307.000	234.000	226.000	160.000	141.000
30	219.000	254.000	190.000	252.000		848.000	245.000	314.000	232.000	232.000	164.000	137.000
31	216.000		206.000	241.000		856.000		315.000		232.000	164.000	

NOTE: After July 12 discharge was measured at Tarbert Landing, Mississippi, 4.6 miles upstream from Red River Landing, Louisiana.

MISSISSIPPI RIVER AT DELTA, LOUISIANA

This station is located on the west bank of the Mississippi River immediately upstream from the mouth of the Yazoo River. Samples are collected at the Corps of Engineers pier at the Delta Casting Yard about two miles north of the U.S. Highway 80 Bridge.

There are no significant upstream pollution sources in the area. The city of Vicksburg with a population of approximately 35,000 on the east bank utilizes the Mississippi River as a source of drinking water.

During July 1963, both endrin and dieldrin were detected in carbon adsorption method samples from this station. (See page 78.)

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Station Location: Mississippi River at Delta, Louisiana

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Mississippi-Yazoo Rivers

Station at: 32°20' Latitude 90°55' Longitude

Miles above mouth: 432

Activation Date: October 6, 1958

Sampled by: Warren County Health Department

Field Analysis by: Mississippi State Board of Health - U.S. Public Health Service

Other Cooperating Agencies: Louisiana State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Vicksburg, Mississippi

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 1,144,500 square miles

Period of record: 1928 to present

Average discharge in record period: 563,600 cfs.

Maximum discharge in record period: 2,080,000 cfs.

Minimum discharge in record period: 99,400 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.30	.30
	Na	24	15
	K	3.7	4.3
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*5	56
	Cd	*3	*2
	As	*25	*20
	B	34	33
	P	*6	*10
	Fe	94	13
	Mo	*3	15
	Mn	*1.3	*1
	Al	–	12
	Be	*.06	*.05
	Cu	*3	18
	Ag	*.5	*.5
	Ni	*3	8
	Co	*5	*2
	Pb	*6	*5
	Cr	*1	*5
	V	*3	*10
	Ba	63	59
	Sr	131	117

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.1	.5	April to June	3.3	.5
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
7/1 - 7/8/63	Endrin	.022
7/1 - 7/8/63	Dieldrin	.022

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT DELTA, LOUISIANA

54

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	3	62	11 7	2	2	1	1	3 2	29	15	15	8	44	17					
10	16	62	11 9	–	–	–	–	– –	30	30	14	8	44	31					
11	19	62	12 20*	–	–	–	–	– –	23	17	27	9	50	19					
12	17	62	1 23*	2	1	1	1	3 1	16	9	19	9	35	13					
1	21	63	2 26*	1	1	0	1	1 1	26	8	18	9	44	12					
2	18	63	3 27*	2	1	1	1	3 1	28	9	21	8	49	12					
4	15	63	5 22*	1	2	0	1	1 2	79	16	39	8	118	18					
5	20	63	6 24*	7	5	1	1	8 5	77	18	39	5	116	19					
6	17	63	7 30*	29	14	1	1	30 14	154	49	25	8	189	50					
7	15	63	9 6*	9	6	0	1	9 6	70	22	10	7	80	23					
8	19	63	10 10*	3	2	1	2	4 3	17	9	20	8	37	12					
9	16	63	12 29*	0	1	9	1	9 1	16	8	32	9	48	12					

PLANKTON POPULATION

STATE	LOUISIANA
MAJOR BASIN	SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN	LOWER MISSISSIPPI-YAZOO RIVERS
STATION LOCATION	MISSISSIPPI RIVER AT
	DELTA, LOUISIANA 054

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	3	62	56	19	80	16	58	15	26	11	39	0	-	-											-							-	-
10	16	62	82	35	26	18	80	10	58	9	28	20	-	-											-							-	-
11	7	62	80	45	26	15	97	12	56	6	22	0	0	0											0							0	0
11	19	62	80	59	83	9	58	8	56	5	19	20	0	-											-							-	-
12	3	62										50	0	1											0							0	0
12	17	62	80	67	56	19	45	5	58	2	7	0	0	12	2	2									0							0	0
1	7	63	82	32	80	28	56	12	57	7	21	0	-	-											-							-	-
1	21	63	80	69	82	17	57	4	92	3	7	0	0	0											0							0	0
2	4	63	82	54	80	11	57	8	56	1	26	0	0	1											0							0	0
2	18	63	80	49	82	19	56	9	9	4	19	0	0	0											0							0	0
3	4	63	61	41	80	20	57	10	92	6	23	0	-	1											0							0	0
3	18	63										0	-	-											-							-	-
4	1	63	80	31	92	17	56	15	58	4	33	-	-	0											0							0	0
4	15	63	80	39	82	9	56	8	92	6	38	-	-	1											4							0	0
5	6	63	80	42	82	37	26	10	9	2	9	-	-	71	11	4	2	2							2							[illegible]	0
5	20	63	82	51	56	12	26	7	80	7	23	-	-	6	11	1									0							[illegible]	0
6	3	63	82	52	57	14	26	8	56	6	20	-	-	0											0							0	[illegible]
6	17	63										-	-	0											0							0	[illegible]
7	1	63										-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63										-	-	-											-							-	-
8	19	63	56	85	26	6					9	-	-	9	2	1									0							0	0
9	3	63	56	83	26	6	23	2	54	2	7	-	-	0											0							0	0
9	16	63	56	52	26	19	58	6	82	6	17	-	-	2											0							0	0

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST–LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI–YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT DELTA, LOUISIANA

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	900	0	0	40	0	40	0	440	370	120	40	69	1																
10	16	62	800	0	0	100	0	0	0	210	500	80	80																		
11	7	62	1700	50	120	240	0	600	50	1050	140	620	200	71	3	69	2	68	1												
11	19	62	700	0	20	170	0	0	0	440	50	270	50	69	1																
12	3	62	1600	0	50	160	0	20	20	1330	70	880	180																		
12	17	62	5700	60	80	390	0	60	60	4530	540	990	40	71	5	88	1	69	1	24	1	35	1	92	1						
1	7	63	900	0	0	20	0	90	0	730	110	750	150	71	2																
1	21	63	2800	0	0	20	0	130	0	2510	130	1100	110	71	4	69	1														
2	4	63	1100	0	20	20	0	40	0	920	90	400	90	71	3																
2	18	63	1900	0	0	20	0	40	110	1630	130	770	150	71	4	69	1														
3	4	63	5000	0	40	0	0	380	170	4010	360	1890	380	69	3	71	2	51	2	68	2	63	1								
3	18	63	1600	0	0	40	0	110	0	1030	400	420	210																		
4	1	63	200	0	0	0	0	0	70	130	20	150	70																		
4	15	63	400	0	0	0	0	20	0	260	70	150	90																		
5	6	63	1300	0	20	110	0	90	0	950	110	950	150	71	3																
5	20	63	700	0	0	70	0	20	0	570	90	510	130	71	1	69	1														
6	3	63	300	0	0	20	0	20	0	180	70	240	290																		
6	17	63	1800	20	0	220	0	330	0	990	200	2090	920	69	2	65	1														
7	-	63	600	0	0	70	0	20	40	290	220	260	40																		
7	15	63	*	-	-	-	-	-	-	-	-	-	-																		
8	-	3	2400	0	30	1130	0	50	0	760	420	1550	740	45	1	69	1	29	1	38	1										
8	19	63	4500	30	0	810	30	50	0	3120	420	1350	150	69	5	68	1	44	1												
9	3	63	2200	20	0	440	20	110	0	1340	240	530	70	69	2	38	1														
9	16	63	2700	20	0	410	0	160	0	1540	590	570	90	69	3	68	2	71	1	88	1	92	1								

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT DELTA, LOUISIANA

54

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLOROFORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	CHLOROFORM EXTRACTABLES TOTAL	NEUTRALS ALIPHATICS	AROMATICS	OXYGENATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
11	8	62	11	15	4373	84	26	56	0	6	14	2	1	11	0	3	1	1	3
12	3	62	12	10	4627	117	33	84	1	8	16	2	2	12	0	3	1	1	3
3	4	63	3	11	*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	21	63	5	29	3280	126	44	82	1	12	15	1	2	11	1	5	3	1	7
6	3	63	6	11	3579	166	71	95	4	18	21	3	2	15	1	8	6	1	13
7	1	63	7	8	3645	154	45	109	2	13	15	1	2	11	1	6	4	1	4

* FLOW UNKNOWN

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE: LOUISIANA
MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN: LOWER MISSISSIPPI-YAZOO RIVERS
STATION LOCATION: MISSISSIPPI RIVER AT DELTA, LOUISIANA

34

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	15	63	28.7	6.6	7.9	1.4	11	4.2	13.4	.0	41	110	145	10	280	46	–	309	–
8	5	63	31.1	6.8	7.8	1.2	16	4.4	13.2	.0	14	110	142	4	250	58	–	299	–
8	19	63	25.6	6.9	8.4	1.4	13	4.6	16.2	.1	14	110	15	35	226	78	–	312	–
9	3	63	–	–	–	–	–	–	–	–	23	120	190	0	*25	78	.0	290	–
9	16	63	–	–	–	–	–	–	–	–	19	126	160	0	50	65	.0	270	–

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Vicksburg, Mississippi
Operated by U.S. Geological Survey

STATE: Louisiana

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Mississippi-Yazoo Rivers

STATION LOCATION: Mississippi River at Delta, Louisiana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	276.000	268.000	340.000	340.000	294.000	296.000	1329.000	357.000	450.000	292.000	298.000	195.000
2	275.000	259.000	342.000	370.000	276.000	299.000	1320.000	370.000	450.000	288.000	295.000	194.000
3	274.000	253.000	349.000	391.000	260.000	306.000	1325.000	383.000	459.000	284.000	285.000	194.000
4	277.000	251.000	354.000	408.000	244.000	326.000	1328.000	415.000	472.000	277.000	274.000	210.000
5	284.000	255.000	365.000	413.000	238.000	335.000	1331.000	455.000	475.000	271.000	268.000	215.000
6	286.000	255.000	379.000	416.000	237.000	344.000	1328.000	497.000	493.000	269.000	260.000	218.000
7	286.000	257.000	377.000	400.000	237.000	350.000	1326.000	535.000	466.000	271.000	256.000	212.000
8	286.000	255.000	342.000	389.000	248.000	359.000	1316.000	558.000	445.000	274.000	254.000	200.000
9	294.000	252.000	306.000	382.000	257.000	367.000	1295.000	565.000	427.000	275.000	252.000	193.000
10	307.000	250.000	285.000	381.000	273.000	395.000	1277.000	557.000	416.000	274.000	254.000	192.000
11	342.000	251.000	267.000	381.000	285.000	519.000	1255.000	534.000	397.000	267.000	257.000	194.000
12	342.000	252.000	260.000	379.000	306.000	650.000	1224.000	503.000	384.000	258.000	263.000	194.000
13	333.000	250.000	263.000	367.000	330.000	786.000	1170.000	467.000	369.000	254.000	266.000	193.000
14	325.000	245.000	275.000	341.000	350.000	865.000	1110.000	440.000	359.000	249.000	264.000	191.000
15	312.000	242.000	286.000	325.000	375.000	945.000	1050.000	414.000	362.000	248.000	258.000	190.000
16	304.000	249.000	281.000	307.000	380.000	985.000	980.000	394.000	369.000	248.000	246.000	187.000
17	295.000	265.000	269.000	293.000	384.000	1030.000	885.000	373.000	376.000	251.000	237.000	184.000
18	290.000	280.000	256.000	285.000	388.000	1067.000	800.000	364.000	385.000	249.000	234.000	185.000
19	287.000	301.000	248.000	290.000	390.000	1095.000	702.000	353.000	394.000	246.000	235.000	186.000
20	285.000	330.000	234.000	299.000	391.000	1137.000	630.000	341.000	396.000	248.000	228.000	188.000
21	287.000	350.000	227.000	316.000	388.000	1181.000	550.000	334.000	393.000	249.000	216.000	192.000
22	289.000	363.000	212.000	325.000	378.000	1215.000	480.000	343.000	392.000	250.000	206.000	190.000
23	293.000	373.000	205.000	338.000	370.000	1237.000	428.000	357.000	390.000	260.000	201.000	187.000
24	304.000	380.000	206.000	350.000	358.000	1253.000	390.000	374.000	381.000	268.000	198.000	187.000
25	320.000	380.000	210.000	367.000	343.000	1265.000	373.000	397.000	370.000	276.000	196.000	186.000
26	319.000	376.000	215.000	373.000	330.000	1274.000	359.000	430.000	355.000	284.000	199.000	185.000
27	307.000	368.000	227.000	372.000	317.000	1281.000	349.000	458.000	333.000	290.000	198.000	182.000
28	291.000	354.000	247.000	364.000	305.000	1293.000	341.000	464.000	306.000	295.000	197.000	180.000
29	288.000	345.000	270.000	347.000		1300.000	341.000	467.000	300.000	298.000	197.000	178.000
30	283.000	339.000	290.000	329.000		1308.000	345.000	469.000	297.000	301.000	196.000	176.000
31	279.000		305.000	310.000		1312.000		456.000		300.000	196.000	

MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI

This sampling point is at the raw water intake of the city of Vicksburg, Mississippi. It is immediately below the mouth of the Yazoo River which drains northwestern Mississippi. During high spring flows, most of the water is from the Yazoo River, while during low flows, most of the water is from the Mississippi River.

There are no known significant industrial or municipal sources of pollution above the immediate vicinity of the station. The city of Vicksburg (population approximately 41,000) obtains its supply from the river. Most of the industries use city water and are located downstream from the station.

During August and September 1963, the chlorinated hydrocarbon insecticides, endrin and dieldrin, were detected in carbon filter samples from this station. (See page 86.)

Station Location: Mississippi River at Vicksburg, Mississippi

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Mississippi-Yazoo Rivers

Station at: 32°19' Latitude 90°54' Longitude

Miles above mouth: 431

Activation Date: 1957-1959; reactivated May 1961

Sampled by: Vicksburg Water Department

Field Analysis by: Vicksburg Water Department

Other Cooperating Agencies: Mississippi State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Vicksburg, Miss.

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 1,144,500 square miles

Period of record: 1928 to present

Average discharge in record period: 563,600 cfs.

Maximum discharge in record period: 2,080,000 cfs.

Minimum discharge in record period: 99,400 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.31	.30
	Na	23	14
	K	3.4	3.8
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	9	*2
	Cd	*3	*2
	As	56	*2
	B	49	32
	P	105	*10
	Fe	138	7
	Mo	*3	9
	Mn	1.3	*1
	Al	–	*10
	Be	*.06	*.05
	Cu	6	5
	Ag	*.5	*.5
	Ni	*3	*2
	Co	*5	*2
	Pb	19	*5
	Cr	*1	*5
	V	*3	*10
	Ba	94	46
	Sr	213	102

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.0	.3	April to June	–	–
January to March	–	–	July to September	4.2	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
8/5 - 8/15/63	Indrin	.020
8/5 - 8/15/63	Dieldrin	.005
9/9 - 9/18/63	Indrin	.020
9/9 - 9/18/63	Dieldrin	.004

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI 21

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER										RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA				DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED			ALPHA		BETA	
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	11 10	1	1	1	1	2 1	2	8	13	8					
10	8	62	11 1	5	4	1	1	6 4	63	37	16	8					
10	15	62	11 18	1	2	1	1	1 2	35	12	7	3					
10	22	62	11 31	2	1	1	1	3 1	21	8	21	8					
10	29	62	11 17	3	1	1	1	4 1	10	8	20	8					
11	5	62	11 29	1	1	1	1	2 1	18	8	17	7					
11	13	62	12 4	1	1	1	1	2 1	20	8	14	9					
11	19	62	1 2	3	2	3	2	6 4	37	11	76	13					
11	26	62	12 31	2	1	0	1	2 1	29	8	24	5					
12	3	62	1 4	1	2	0	1	1 2	11	14	27	9					
12	10	62	1 3	1	3	1	1	2 3	34	32	22	9					
12	17	62	1 7	3	2	2	2	5 2	31	5	36	5					
12	24	62	1 10	3	2	1	1	4 2	27	10	29	9					
12	31	62	1 14	4	2	1	1	5 2	15	4	23	5					
1	7	63	1 21	3	3	3	2	6 3	31	5	19	4					
1	14	63	1 28	3	2	1	1	4 2	16	7	67	9					
1	21	63	2 1	3	2	1	1	4 2	29	8	27	8					
1	29	63	2 11	2	1	1	1	3 1	38	4	24	4					
2	4	63	2 20	4	3	1	1	5 3	64	12	24	9					
2	11	63	2 1	2	2	0	1	2 2	47	9	24	9					
2	18	63	3 4	3	2	1	1	4 2	69	5	31	4					
2	25	63	3 11	2	2	0	1	2 2	65	14	21	6					
3	4	63	3 25	2	1	1	1	3 1	45	9	29	5					
3	11	63	3 27	13	7	1	1	14 7	158	23	34	8					
3	18	63	4 4	5	6	0	1	5 6	200	43	47	8					
3	25	63	4 10	4	3	0	1	4 3	82	18	47	8					
4	29	63	5 17*	1	1	0	1	1 1	54	15	32	8					
5	27	63	6 17*	1	1	1	2	2 2	98	31	45	4					
6	24	63	7 15*	3	4	0	1	3 4	52	17	36	5					
7	29	63	9 9*	3	3	1	2	4 3	50	8	33	4					
8	26	63	9 23*	1	1	1	1	2 1	17	7	28	4					
9	30	63	10 22*	1	1	1	1	2 1	13	5	24	5					

PLANKTON POPULATION

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI 021

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS														CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	1	62	26	30	58	9	20	7	56	7	47	-	-	-																				1	1
10	15	62	56	15	26	13	82	11	58	11	50	-	-	0													0							0	0
11	5	62	97	30	56	23	80	15	58	14	18	-	-	0													1							0	0
11	19	62	80	66	26	6	56	6	83	5	17	-	-	0													0							0	0
12	3	62	97	33	56	24	80	10	9	7	26	50	-	2													0							0	0
12	17	62	80	71	56	12	45	6	82	4	7	-	-	0													0							0	0
1	7	63	82	56	80	9	56	6	57	5	24	-	-	0													0							0	0
1	21	63	80	66	57	12	82	8	56	6	6	-	-	0													0							0	0
2	4	63	80	21	82	20	57	20	56	15	24	-	-	0													0							0	0
2	18	63	80	41	92	14	82	11	56	11	23	-	-	-													-							-	-
3	4	63	57	29	61	26	56	11	80	8	24	-	-	0													0							0	0
3	18	63	80	27	56	11	36	9	71	8	45	-	-	2													0							0	0
4	1	63	56	22	82	21	80	21	26	8	28	-	-	1													0							0	0
4	15	63	56	22	80	19	92	8	26	6	45	-	-	15	11	1	17	1									15	50	2	51	2	76	1	0	0
5	6	63	80	43	82	32	26	6	57	3	16	-	-	177	11	5	2	4	17	1							1							0	0
5	20	63	82	48	56	15	26	8	57	7	22	-	-	3													0							0	0
6	3	63	82	56	9	8	56	5	26	3	28	-	-	-													-							-	-
6	17	63	80	51	56	13	26	11	57	7	18	-	-	-													-							-	-
7	1	63										-	-	-													-							-	-
7	15	63										-	-	-													-							-	-
8	5	63	26	29	56	23	58	17	57	7	24	-	-	0													0							0	0
8	19	63	56	84	58	5	26	4	27	3	4	-	-	5													1							0	0
9	3	63	56	50	58	20	26	11	82	4	15	-	-	1													0							0	0
9	16	63	56	48	82	13	26	10	27	7	22	-	-	0													0							0	0

PLANKTON POPULATION

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI

21

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH	10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	600	0	0	50	0	90	50	320	140	230	90																		
10	15	62	1200	40	0	120	0	120	0	520	370	210	80	68	1	71	1														
11	5	62	1300	0	30	180	0	30	0	810	210	810	170	71	2	69	1														
11	19	62	4300	40	40	250	0	270	20	2900	790	910	40	71	4	69	3	92	2	68	1										
12	3	62	1400	0	90	50	0	160	0	1080	70	380	160	71	3	69	2														
12	17	62	3900	0	0	240	0	20	40	3260	330	1120	180	71	4	69	3														
1	7	63	1200	0	20	0	0	20	0	880	260	840	240	71	3	69	1														
1	21	63	3600	0	0	0	0	210	0	2650	760	2180	250	71	4	69	2	92	1	51	1	82	1								
2	4	63	1700	0	0	20	0	70	0	1390	180	0	0	71	3	69	2	68	1												
2	18	63	2700	0	0	0	0	480	110	1630	480	620	110	71	3	51	2	92	1	69	1										
3	4	63	3600	0	0	110	0	110	290	2790	260	920	110	71	4	69	3	65	1												
3	18	63	1400	0	0	0	0	20	40	1070	290	590	340	71	3	69	2														
4	1	63	200	0	0	0	0	40	0	110	40	130	130																		
4	15	63	400	0	0	40	0	40	0	240	70	110	150	69	1																
5	6	63	2600	0	40	400	0	130	270	1370	440	950	250	71	3	65	1	38	1												
5	20	63	600	0	0	40	0	20	0	460	90	660	180	71	1																
6	3	63	800	0	0	150	0	40	40	400	130	420	230	71	1																
6	17	63	2400	0	0	420	0	130	80	1300	460	1220	130	69	3	68	1	71	1	92	1										
7	1	63	600	0	0	40	0	0	20	370	150	130	40																		
7	15	63	*	-	-	-	-	-	-	-	-	-	-																		
8	5	63	800	0	0	230	20	40	20	370	150	410	80	68	1																
8	19	63	3800	50	0	520	0	70	0	2360	760	1750	70	69	4	68	1														
9	3	63	2000	0	20	200	20	40	0	1410	330	260	40	69	3	68	2	71	1												
9	16	63	1700	0	0	210	0	250	0	700	520	500	70	68	1	69	1	71	1	88	1										

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	12	62	10	22	6000#	79	14	65	0	4	6	1	1	4	0	2	1	0	1
11	12	62	11	21	5400#	111	26	85	1	6	11	1	1	8	1	3	1	1	3
12	7	62	12	17	5000#	142	35	107	1	9	14	3	2	9	0	4	3	1	3
1	7	63	1	16	5400#	131	34	97	-	-	-	-	-	-	-	-	-	-	-
2	13	63	2	22	5400#	143	50	93	2	10	19	2	2	15	0	7	4	1	7
3	13	63	3	22	5400#	96	19	77	-	-	-	-	-	-	-	-	-	-	-
4	8	63	4	17	5400#	79	27	52	1	6	10	2	1	6	1	3	3	1	3
5	7	63	5	16	5400#	90	26	64	-	-	-	-	-	-	-	-	-	-	-
6	10	63	6	19	5400#	107	40	67	2	11	11	2	1	8	0	6	4	1	5
7	8	63	7	16	5400#	60	22	38	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	15	5000#	86	36	50	2	10	9	1	1	7	0	4	4	3	4
9	9	63	9	18	5400#	48	13	35	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI 21

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	22.5	-	8.2	-	-	-	-	-	-	80	124	-	240	-	-	-	-
10	8	62	22.0	-	8.1	-	-	-	-	-	-	114	140	-	250	-	-	-	-
10	15	62	23.0	-	8.2	-	-	-	-	-	-	86	120	-	300	-	-	-	-
10	22	62	21.0	-	8.0	-	-	-	-	-	-	114	128	-	160	-	-	-	-
10	29	62	17.0	-	7.8	-	-	-	-	-	-	90	126	-	160	-	-	-	-
11	5	62	16.0	-	7.9	-	-	-	-	-	-	96	128	-	160	-	-	-	-
11	13	62	13.0	-	8.0	-	-	-	-	-	-	116	160	-	220	-	-	-	-
11	19	62	13.0	-	8.0	-	-	-	-	-	-	124	168	-	160	-	-	-	-
11	26	62	12.0	-	7.9	-	-	-	-	-	-	60	160	-	200	-	-	-	-
12	3	62	13.0	-	7.9	-	-	-	-	-	-	80	150	-	130	-	-	-	-
12	10	62	10.0	-	7.8	-	-	-	-	-	-	112	140	-	150	-	-	-	-
12	17	62	7.0	-	8.0	-	-	-	-	-	-	130	148	-	110	-	-	-	-
12	24	62	8.0	-	8.0	-	-	-	-	-	-	140	150	-	140	-	-	-	-
12	31	62	7.0	-	8.0	-	-	-	-	-	-	130	156	-	120	-	-	-	-
1	7	63	7.0	-	7.9	-	-	-	-	-	-	100	132	-	160	-	-	-	-
1	14	63	6.0	-	8.0	-	-	-	-	-	-	100	120	-	160	-	-	-	-
1	21	63	4.0	-	8.1	-	-	-	-	-	-	96	132	-	140	-	-	-	-
1	27	63	3.0	-	8.1	-	-	-	-	-	-	76	130	-	160	-	-	-	-
2	4	63	4.0	-	8.0	-	-	-	-	-	-	100	130	-	140	-	-	-	-
2	11	63	5.0	-	8.2	-	-	-	-	-	-	80	140	-	120	-	-	-	-
2	18	63	4.0	-	8.0	-	-	-	-	-	-	80	130	-	120	-	-	-	-
2	25	63	6.0	-	7.9	-	-	-	-	-	-	90	130	-	180	-	-	-	-
3	4	63	8.0	-	8.0	-	-	-	-	-	-	80	120	-	140	-	-	-	-
3	11	63	11.0	-	8.0	-	-	-	-	-	-	80	110	-	700	-	-	-	-
3	18	63	11.0	-	7.8	-	-	-	-	-	-	80	80	-	800	-	-	-	-
3	25	63	12.0	-	7.9	-	-	-	-	-	-	80	90	-	350	-	-	-	-
4	1	63	13.0	-	7.6	-	-	-	-	-	-	80	86	-	320	-	-	-	-
4	8	63	14.0	-	7.8	-	-	-	-	-	-	60	96	-	240	-	-	-	-
4	15	63	17.0	-	7.7	-	-	-	-	-	-	90	110	-	160	-	-	-	-
4	22	63	19.0	-	7.9	-	-	-	-	-	-	90	114	-	240	-	-	-	-
4	29	63	20.0	-	8.0	-	-	-	-	-	-	120	148	-	160	-	-	-	-
5	6	63	21.0	-	7.9	-	-	-	-	-	-	106	128	-	350	-	-	-	-
5	13	63	23.0	-	8.0	-	-	-	-	-	-	80	100	-	250	-	-	-	-
5	20	63	25.0	-	8.1	-	-	-	-	-	-	130	140	-	350	-	-	-	-
5	27	63	23.0	-	7.9	-	-	-	-	-	-	120	160	-	350	-	-	-	-
6	3	63	23.0	-	7.7	-	-	-	-	-	-	116	144	-	450	-	-	-	-
6	10	63	26.0	-	7.7	-	-	-	-	-	-	120	128	-	200	-	-	-	-
6	17	63	28.0	-	8.0	-	-	-	-	-	-	122	120	-	120	-	-	-	-
6	24	63	28.0	-	7.6	-	-	-	-	-	-	132	140	-	200	-	-	-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSISSIPPI

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-YAZOO RIVERS

STATION LOCATION MISSISSIPPI RIVER AT VICKSBURG, MISSISSIPPI 21

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	1	63	27.0	-	7.6	-	-	-	-	-	-	106	124	-	320	-	-	-	-
7	8	63	29.0	-	7.8	-	-	-	-	-	-	122	138	-	150	-	-	-	-
7	15	63	28.0	-	7.8	-	-	-	-	-	-	138	122	-	350	-	-	-	-
7	21	63	28.0	-	7.7	-	-	-	-	-	-	112	120	-	230	-	-	-	-
7	29	63	28.0	-	7.8	-	-	-	-	-	-	104	112	-	200	-	-	-	-
8	5	63	29.0	-	7.9	-	-	-	-	-	-	104	116	-	150	-	-	-	-
8	12	63	31.0	-	8.0	-	-	-	-	-	-	122	132	-	50	-	-	-	-
8	19	63	28.0	-	7.6	-	-	-	-	-	-	120	128	-	50	-	-	-	-
8	26	63	29.0	-	7.5	-	-	-	-	-	-	126	150	-	50	-	-	-	-
9	3	63	28.0	-	7.4	-	-	-	-	-	-	130	156	-	130	-	-	-	-
9	9	63	28.0	-	8.0	-	-	-	-	-	-	90	120	-	100	-	-	-	-
9	16	63	26.0	-	7.9	-	-	-	-	-	-	120	120	-	100	-	-	-	-
9	23	63	24.0	-	7.8	-	-	-	-	-	-	100	120	-	110	-	-	-	-
9	30	63	22.0	-	8.0	-	-	-	-	-	-	120	120	-	180	-	-	-	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Vicksburg, Mississippi
Operated by U.S. Geological Survey

STATE: Mississippi

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Mississippi-Yazoo Rivers

STATION LOCATION: Mississippi River at Vicksburg, Mississippi

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	276.000	268.000	340.000	340.000	294.000	296.000	1329.000	357.000	450.000	292.000	298.000	195.000
2	275.000	259.000	342.000	370.000	276.000	299.000	1320.000	370.000	450.000	288.000	295.000	194.000
3	274.000	253.000	349.000	391.000	260.000	306.000	1325.000	383.000	459.000	284.000	285.000	194.000
4	277.000	251.000	354.000	408.000	244.000	326.000	1328.000	415.000	472.000	277.000	274.000	210.000
5	284.000	255.000	365.000	413.000	238.000	335.000	1331.000	455.000	475.000	271.000	268.000	215.000
6	286.000	255.000	379.000	416.000	237.000	344.000	1328.000	497.000	493.000	269.000	260.000	218.000
7	286.000	257.000	377.000	400.000	237.000	350.000	1326.000	535.000	466.000	271.000	256.000	212.000
8	286.000	255.000	342.000	389.000	248.000	359.000	1316.000	558.000	445.000	274.000	254.000	200.000
9	294.000	252.000	306.000	382.000	257.000	367.000	1295.000	565.000	427.000	275.000	252.000	193.000
10	307.000	250.000	285.000	381.000	273.000	395.000	1277.000	557.000	416.000	274.000	254.000	192.000
11	342.000	251.000	267.000	381.000	285.000	519.000	1255.000	534.000	397.000	267.000	257.000	194.000
12	342.000	252.000	260.000	379.000	306.000	650.000	1224.000	503.000	384.000	258.000	263.000	194.000
13	333.000	250.000	263.000	367.000	330.000	786.000	1170.000	467.000	369.000	254.000	266.000	193.000
14	325.000	245.000	275.000	341.000	350.000	865.000	1110.000	440.000	359.000	249.000	264.000	191.000
15	312.000	242.000	286.000	325.000	375.000	945.000	1050.000	414.000	362.000	248.000	258.000	190.000
16	304.000	249.000	281.000	307.000	380.000	985.000	980.000	394.000	369.000	248.000	246.000	187.000
17	295.000	265.000	269.000	293.000	384.000	1030.000	885.000	373.000	376.000	251.000	237.000	184.000
18	290.000	280.000	256.000	285.000	388.000	1067.000	800.000	364.000	385.000	249.000	234.000	185.000
19	287.000	301.000	248.000	290.000	390.000	1095.000	702.000	353.000	394.000	246.000	235.000	186.000
20	285.000	330.000	234.000	299.000	391.000	1137.000	630.000	341.000	396.000	248.000	228.000	188.000
21	287.000	350.000	227.000	316.000	388.000	1181.000	550.000	334.000	393.000	249.000	216.000	192.000
22	289.000	363.000	212.000	325.000	378.000	1215.000	480.000	343.000	392.000	250.000	206.000	190.000
23	293.000	373.000	205.000	338.000	370.000	1237.000	428.000	357.000	390.000	260.000	201.000	187.000
24	304.000	380.000	206.000	350.000	358.000	1253.000	390.000	374.000	381.000	268.000	198.000	187.000
25	320.000	380.000	210.000	367.000	343.000	1265.000	373.000	397.000	370.000	276.000	196.000	186.000
26	319.000	376.000	215.000	373.000	330.000	1274.000	359.000	430.000	355.000	284.000	199.000	185.000
27	307.000	368.000	227.000	372.000	317.000	1281.000	349.000	458.000	333.000	290.000	198.000	182.000
28	291.000	354.000	247.000	364.000	305.000	1293.000	341.000	464.000	306.000	295.000	197.000	180.000
29	288.000	345.000	270.000	347.000		1300.000	341.000	467.000	300.000	298.000	197.000	178.000
30	283.000	339.000	290.000	329.000		1308.000	345.000	469.000	297.000	301.000	196.000	176.000
31	279.000		305.000	310.000		1312.000		456.000		300.000	196.000	

MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS

This station is located on the west shore of the Mississippi River. Samples are collected from the floating dock of Oklahoma-Mississippi River Products Company.

During August and September 1963, the chlorinated hydrocarbon insecticides, endrin and dieldrin, were detected in samples from this station. (See page 96.)

Raw sewage from a connected population of 19,400 is discharged within a half mile upstream by West Memphis, Arkansas. Across the river, Memphis, Tennessee discharges raw sewage from a population of 475,500 through four outfalls, of which three are upstream and one is downstream. A rising trend in coliform densities over a six-year period of record has been observed at this station.

MEDIAN COLIFORM BACTERIA/100 ml.

Water Year	1958	1959	1960	1961	1962	1963
Autumn	–	19,000	13,000	16,000	23,000	38,000
Winter	–	8,600	3,800	4,400	12,000	12,000
Spring	6,500	13,000	18,000	23,000	38,000	43,000
Summer	11,000	25,000	25,000	28,000	48,000	30,000

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Station Location: Mississippi River at West Memphis, Arkansas

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Mississippi-Cairo to Helena

Station at: 35°07' Latitude 90°10' Longitude

Miles above mouth: 725

Activation Date: January 1958

Sampled by: Memphis (Tennessee) Light, Gas and Water Division

Field Analysis by: Memphis (Tennessee) Light, Gas and Water Division

Other Cooperating Agencies: Arkansas State Board of Health
Tennessee Department of Public Health

Hydrologic Data:

Nearest pertinent gaging station: At Memphis, Tennessee

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 932,800 square miles

Period of record: 1933 to present

Average discharge in record period: 460,800 cfs.

Maximum discharge in record period: 1,980,000 cfs.

Minimum discharge in record period: 79,200 cfs.

Remarks.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-4-63	0.10
3-10-63	0.11
4-22-63	0.06
4-29-63	0.07
5-6-63	0.06
5-13-63	0.06
5-20-63	0.06
5-27-63	0.08
6-3-63	0.07
6-10-63	0.05
6-17-63	0.04
6-24-63	0.08
7-1-63	0.05
7-8-63	0.05
7-15-63	0.05
7-22-63	0.07
7-29-63	0.07
8-5-63	0.07
8-12-63	0.06
8-19-63	0.05
8-25-63	0.03
9-3-63	0.08
9-9-63	0.06
9-23-63	0.09
9-30-63	0.11

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.23	.30
	Na	23	14
	K	3.8	3.7
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	7	6
	Cd	*2	*3
	As	*24	*25
	B	38	42
	P	*12	45
	Fe	19	42
	Mo	19	14
	Mn	.6	*1.5
	Al	–	36
	Be	*.06	*.08
	Cu	2	5
	Ag	*.5	*.8
	Ni	*1	*3
	Co	*5	*3
	Pb	12	*8
	Cr	*1	*8
	V	*2	15
	Ba	79	53
	Sr	92	132

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.0	.3	April to June	3.6	.4
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
8/13 - 8/20/63	Indrin	.019
8/13 - 8/20/63	Dieldrin	.002
9/3 - 9/9/63	Indrin	.026
9/3 - 9/9/63	Dieldrin	.015

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-CAIRO TO HELENA

STATION LOCATION MISSISSIPPI RIVER AT

WEST MEMPHIS, ARKANSAS 22

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA		
MO.	DAY	YR	MO. DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±	
10	1	62	10 25	-	-	-	-	- -	11	7	23	8	34	11						
10	8	62	11 8	-	-	-	-	- -	32	34	9	13	41	36						
10	15	62	11 8	0	3	0	1	0 3	35	35	37	9	72	36						
10	22	62	11 13	-	-	-	-	- -	107	17	36	10	143	20						
10	29	62	11 23	-	-	-	-	- -	98	7	18	6	116	9						
11	26	62	12 21*	0	2	2	2	2 3	56	32	28	9	84	33						
12	31	62	1 16*	1	1	0	1	1 1	9	7	18	9	27	11						
1	21	63	3 1*	2	2	0	1	2 2	19	9	10	9	29	13						
2	25	63	3 18*	1	2	0	1	1 2	39	5	22	4	61	6						
3	10	63	4 17*	6	3	2	1	8 3	82	13	20	8	102	15						
4	29	63	5 20*	1	1	2	2	3 2	27	4	36	4	63	6						
5	27	63	6 13*	3	6	0	1	3 6	142	67	39	9	181	68						
6	24	63	7 3*	2	2	0	1	2 2	47	16	32	9	79	13						
7	29	63	8 16*	1	1	1	1	2 1	24	8	35	9	59	12						
8	28	63	9 23*	1	1	2	2	3 2	3	3	33	4	36	5						
9	30	63	10 22*	0	1	2	2	2 2	4	4	27	6	31	7						

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-CAIRO TO HELENA

STATION LOCATION MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS 022

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS														CRUSTACEA								
															GENERA AND COUNT LEVEL (See text for Codes)														GENERA AND COUNT LEVEL (See text for Codes)							
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT				NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD		NEMATODES (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	20	17	26	16	80	15	58	10	42	-	-	0											1						0	0
10	15	62	58	23	80	22	82	14	56	10	31	-	-	0											0						0	0
11	5	62	56	34	80	17	58	13	71	8	28	-	-	0											0						0	0
11	19	62	82	38	26	23	80	16	56	8	15	70	-	0											0						0	0
12	3	62	82	31	56	17	57	14	80	13	25	-	-	5											0						0	0
12	17	62	80	37	56	21	97	13	82	10	19	90	-	-											-						-	-
1	7	63	82	56	80	14	92	5	57	4	21	-	-	0											0						0	0
1	21	63	80	65	92	13	82	8	56	5	9	-	-	0											0						0	0
2	4	63	82	68	80	8	57	5	92	4	15	-	-	1											0						0	0
2	18	63	56	24	57	16	61	11	92	11	38	-	-	0											0						0	0
3	4	63	57	45	82	25	56	14	9	3	13	-	-	1											0						0	0
4	22	63	80	51	56	19	82	8	58	3	19	-	-	1											1						0	0
5	6	63	80	42	82	25	57	7	27	6	20	-	-	77	11	4	2	2							11	76	2				0	0
5	20	63	82	37	80	21	56	10	92	5	27	100	-	257	2	5	11	5							0						0	0
5	3	63	82	79	9	4	57	3	70	2	12	-	-	0											0						0	0
6	17	63	56	22	92	21	80	19	35	16	22	-	-	2											1						0	0
7	1	63	82	27	57	11	56	10	80	9	43	-	-	3											3						0	0
7	15	63										-	-	0											0						0	0
8	5	63	56	35	82	18	26	17	58	14	16	-	-	7	22	1									7	76	2				0	0
8	19	63	56	87	26	6	82	3	58	2	2	-	-	1											0						0	0
9	3	63	56	93	58	3					4	-	-	15	11	1	17	1							1						0	0
9	16	63	27	42	58	30	92	7	82	6	17	-	-	1											0						0	0

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-CAIRO TO HELENA

STATION LOCATION MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS 22

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
				BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR	TOTAL	COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	500	0	0	0	50	0	0	270	230	320	90	69	1																		
10	15	62	600	0	10	100	0	20	0	350	140	310	140																				
11	5	62	1200	0	0	180	0	20	0	520	450	900	410	71	2																		
11	19	62	900	50	50	20	0	70	0	620	90	180	160	69	1	68	1	71	1														
12	3	62	1700	0	20	90	0	90	0	1260	200	1680	200	71	2	69	2																
12	17	62	5100	0	0	220	0	160	0	4200	480	2950	400	71	4	69	4	51	1														
1	7	63	1000	0	0	30	0	30	0	920	20	350	80	71	3																		
1	21	63	3300	0	110	20	0	0	0	3020	170	340	20	71	5	69	1																
2	4	63	3000	0	0	110	0	110	0	2680	110	770	130	71	5																		
2	18	63	3100	0	0	20	0	130	200	2460	290	880	220	71	4	68	2	69	2	77	1												
3	4	63	2000	0	0	0	0	0	0	1910	70	420	20	71	4	69	1	68	1														
4	22	63	4000	0	290	290	0	210	190	2770	210	4450	480	71	5	69	1	17	1														
5	6	63	1400	0	0	110	0	0	0	1230	20	1320	260	71	3	69	2																
5	20	63	5400	0	40	290	0	180	190	3910	800	2810	670	71	5	69	2	92	2	77	1	68	1										
6	3	63	1000	0	40	440	0	0	0	330	180	550	350	71	1																		
6	17	63	1700	20	20	370	0	150	0	950	130	1910	1740	69	3	71	2																
7	1	63	1600	20	0	550	0	40	90	750	110	480	240	69	2	71	2	24	1	38	1												
7	15	63	900	0	0	150	0	40	20	310	370	240	70																				
8	5	63	2200	440	20	390	0	80	0	1080	190	540	20	69	2	68	2	71	1														
8	19	63	2900	0	0	330	0	70	0	1870	680	550	480	69	3	68	2	71	1	88	1												
9	3	63	2000	40	20	500	20	40	0	930	430	370	240	69	3	38	1																
9	16	63	1900	70	0	410	0	110	0	620	560	90	140	68	2	92	1	88	1														

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE: ARKANSAS

MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN: LOWER MISSISSIPPI-CAIRO TO HELENA

STATION LOCATION: MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS 22

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
BEGINNING			END								NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLOROFORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGENATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	9	62	10	16	3740	96	15	81	0	3	8	1	1	6	0	2	1	0	1
8	13	63	8	20	2460#	196	57	139	1	17	18	1	2	14	1	5	4	1	11
9	3	63	9	9	2080	217	68	149	2	22	20	2	2	15	1	8	5	1	10
9	30	63	10	14	4488	146	50	96	1	12	17	1	2	13	1	8	4	1	7

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE: ARKANSAS
MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN: LOWER MISSISSIPPI-CAIRO TO HELENA
STATION LOCATION: MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS

22

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	20.9	7.8	8.0	.7	17	1.7	5.7	.0	15	128	178	16	140	58	.2	302	87000
10	8	62	21.0	7.4	7.9	.5	24	1.5	6.8	.2	16	106	156	16	450	58	.2	258	38000
10	15	62	22.1	7.5	8.0	.7	16	2.3	7.2	.1	19	104	162	17	170	66	.2	270	94000
10	22	62	20.2	7.7	8.0	.6	10	3.0	8.0	.0	15	106	156	17	150	52	.1	248	48000
10	29	62	16.3	8.6	8.0	.9	10	2.8	8.0	.3	16	114	172	17	150	67	.2	276	-
11	5	62	12.8	9.2	8.0	1.3	29	3.3	9.2	.0	15	112	164	17	330	62	.1	268	40000
11	12	62	11.2	10.0	8.1	1.7	11	3.6	8.1	.4	25	116	188	17	90	77	-	322	19000
11	19	62	10.8	9.4	7.8	1.6	19	3.6	7.7	.3	41	88	183	17	110	102	.2	354	11000
11	26	62	10.2	9.7	7.9	-	18	3.9	8.4	.4	25	90	168	16	110	97	.1	280	-
12	3	62	10.1	10.1	7.9	1.7	16	4.0	10.1	.1	22	88	150	12	110	64	.1	246	20000
12	10	62	6.9	11.2	8.0	2.7	12	3.8	9.0	.3	19	110	166	12	75	64	.1	264	35000
12	17	62	4.2	12.4	8.1	3.9	17	2.6	7.7	.2	18	110	162	15	100	56	.0	244	80000
12	31	62	3.5	12.3	8.0	4.3	16	-	-	.4	19	82	142	12	100	58	.0	226	6500
1	7	63	3.4	12.3	8.0	2.3	24	2.9	8.0	.3	22	78	132	12	125	60	.1	214	14000
1	14	63	3.5	11.8	7.9	2.1	19	.6	8.9	.5	17	102	158	12	85	58	.2	238	8000
1	21	63	2.0	13.0	8.1	1.9	18	.5	6.1	.6	20	88	142	14	150	55	.1	210	25000
2	4	63	.8	13.6	8.0	2.0	17	.3	8.3	.0	17	90	132	12	70	36	.0	208	7000
2	18	63	2.7	12.5	8.0	1.8	6	-	-	.0	18	88	146	12	80	52	.0	240	10000
2	25	63	3.3	12.5	7.9	2.7	29	1.5	9.1	.0	19	96	142	12	180	51	.1	244	47000
3	4	63	5.9	12.4	8.0	1.7	20	.3	10.0	.0	19	92	142	12	90	50	.0	230	10000
3	11	63	6.2	10.5	7.8	3.8	38	.8	11.3	.1	17	88	132	16	650	44	.0	218	43000
4	22	63	18.6	6.5	7.8	.5	-	2.2	8.8	.0	13	100	154	17	130	50	.0	220	36000
4	29	63	18.0	7.5	7.8	2.1	14	3.3	7.3	.0	16	110	172	11	70	65	.0	266	70000
5	6	63	18.9	8.0	7.7	1.0	18	2.6	6.5	.0	12	80	124	16	120	44	.0	218	20000
5	13	63	21.9	6.6	7.7	1.1	34	2.7	9.4	.0	14	106	164	17	650	59	.0	250	-
5	20	63	22.5	6.8	7.8	1.2	22	2.0	7.5	.0	16	114	174	15	290	65	.0	286	-
5	27	63	20.0	7.0	7.8	1.2	37	2.6	9.8	.0	14	96	156	17	900	-	.0	248	50000
6	3	63	22.6	6.9	7.7	.8	15	2.4	9.3	.1	13	90	142	15	220	57	-	206	22000
6	10	63	26.4	6.2	7.8	.9	18	2.0	6.1	.1	13	94	150	13	160	53	.0	220	50000
6	17	63	26.2	5.9	7.8	.7	24	2.1	6.7	-	17	76	160	11	180	-	.0	268	52000
6	24	63	25.4	5.9	7.8	.8	38	2.7	6.9	.0	17	102	158	14	510	64	.2	260	30000
7	1	63	28.3	6.6	7.8	.7	20	2.3	6.7	.0	16	100	174	17	140	72	.1	300	63000
7	8	63	29.2	6.1	7.8	1.5	15	2.3	5.8	.0	16	100	166	13	350	73	.3	290	80000
7	15	63	27.1	6.5	7.8	.6	16	2.6	7.1	.0	14	102	152	14	320	55	-	248	66000
7	22	63	28.9	6.7	7.9	.6	14	1.3	5.2	.0	15	98	158	15	100	65	.1	266	*500
7	29	63	28.4	6.5	7.9	.6	13	1.2	4.5	.0	14	86	144	15	140	56	.2	244	30000
8	5	63	30.4	6.6	7.9	.8	17	2.3	6.3	.0	14	104	166	15	120	64	.2	278	40000
8	12	63	29.5	7.1	8.0	1.3	31	2.8	8.7	.1	16	100	156	12	160	61	.3	260	6500

CHEMICAL. PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ARKANSAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER MISSISSIPPI-CAIRO TO HELENA

STATION LOCATION MISSISSIPPI RIVER AT WEST MEMPHIS, ARKANSAS 22

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
8	19	63	28.2	6.7	8.1	1.2	15	2.1	5.1	.1	15	103	152	17	100	57	.4	256	10000
8	25	63	26.8	6.4	8.0	.5	13	2.0	5.8	.0	15	108	162	14	110	63	.3	264	22000
9	3	63	29.2	7.3	8.0	.5	25	-	-	.0	16	95	155	12	65	69	.2	254	-
9	9	63	27.0	7.0	7.9	.6	9	2.7	6.9	.0	17	110	172	11	60	69	.2	284	-
9	16	63	23.9	7.3	7.8	.6	41	2.9	8.8	.0	18	108	163	11	35	71	.1	290	-
9	23	63	24.0	8.0	8.0	.8	10	-	8.6	.0	19	118	164	17	100	76	.1	288	57000
9	30	63	21.3	7.7	8.0	-	6	1.8	4.8	.0	19	116	172	11	45	77	.1	298	14000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Memphis, Tennessee
Operated by U.S. Geological Survey

STATE: Arkansas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Mississippi-Cairo to Helena

STATION LOCATION: Mississippi River at West Memphis, Arkansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	202.000	217.000	308.000	363.000	195.000	265.000	1266.000	340.000	434.000	224.000	221.000	178.000
2	209.000	215.000	319.000	363.000	188.000	273.000	1251.000	358.000	429.000	217.000	209.000	185.000
3	215.000	206.000	319.000	349.000	186.000	269.000	1232.000	404.000	411.000	213.000	208.000	181.000
4	217.000	208.000	299.000	333.000	183.000	256.000	1213.000	461.000	397.000	221.000	208.000	171.000
5	221.000	213.000	252.000	322.000	181.000	260.000	1184.000	492.000	385.000	232.000	202.000	161.000
6	236.000	217.000	211.000	319.000	186.000	273.000	1160.000	489.000	363.000	236.000	200.000	158.000
7	254.000	221.000	197.000	322.000	209.000	315.000	1128.000	461.000	333.000	230.000	206.000	159.000
8	262.000	226.000	193.000	322.000	236.000	424.000	1086.000	432.000	306.000	222.000	209.000	163.000
9	265.000	228.000	199.000	310.000	262.000	603.000	1033.000	406.000	291.000	215.000	213.000	164.000
10	260.000	213.000	208.000	291.000	284.000	755.000	971.000	387.000	282.000	204.000	215.000	156.000
11	252.000	195.000	217.000	254.000	304.000	861.000	884.000	363.000	286.000	195.000	209.000	148.000
12	248.000	193.000	221.000	219.000	317.000	923.000	789.000	340.000	302.000	195.000	199.000	146.000
13	238.000	202.000	219.000	209.000	326.000	959.000	695.000	326.000	324.000	193.000	199.000	151.000
14	224.000	224.000	213.000	213.000	328.000	987.000	615.000	317.000	342.000	188.000	200.000	154.000
15	222.000	254.000	204.000	219.000	328.000	1004.000	552.000	306.000	354.000	181.000	206.000	156.000
16	232.000	275.000	188.000	232.000	324.000	1029.000	503.000	295.000	363.000	181.000	208.000	159.000
17	236.000	297.000	173.000	250.000	322.000	1060.000	458.000	295.000	354.000	188.000	204.000	159.000
18	236.000	322.000	159.000	267.000	315.000	1087.000	414.000	302.000	340.000	195.000	190.000	156.000
19	234.000	342.000	149.000	280.000	308.000	1124.000	365.000	308.000	335.000	192.000	180.000	151.000
20	240.000	354.000	148.000	297.000	297.000	1160.000	326.000	328.000	333.000	193.000	173.000	146.000
21	256.000	354.000	156.000	322.000	284.000	1199.000	302.000	347.000	313.000	199.000	170.000	144.000
22	258.000	345.000	168.000	340.000	269.000	1227.000	291.000	401.000	282.000	206.000	173.000	143.000
23	242.000	331.000	180.000	347.000	248.000	1251.000	284.000	434.000	262.000	215.000	180.000	141.000
24	226.000	315.000	186.000	338.000	226.000	1271.000	277.000	445.000	252.000	226.000	178.000	136.000
25	222.000	308.000	200.000	322.000	221.000	1281.000	275.000	442.000	246.000	238.000	175.000	126.000
26	224.000	304.000	217.000	306.000	224.000	1296.000	280.000	445.000	246.000	246.000	173.000	124.000
27	224.000	304.000	238.000	273.000	230.000	1301.000	286.000	442.000	244.000	252.000	171.000	129.000
28	224.000	304.000	260.000	242.000	244.000	1306.000	293.000	414.000	240.000	248.000	171.000	132.000
29	221.000	302.000	284.000	219.000		1301.000	308.000	399.000	236.000	238.000	168.000	129.000
30	217.000	302.000	317.000	209.000		1296.000	328.000	406.000	232.000	228.000	166.000	128.000
31	208.000		347.000	204.000		1281.000		421.000		226.000	168.000	

OUACHITA RIVER AT BASTROP, LOUISIANA

The site of this Water Pollution Surveillance station is approximately 14 miles downstream from the Arkansas-Louisiana State line. Samples are collected from the east bank, 7 miles west of Bastrop.

The Ouachita River is navigable at this point and the flow is regulated by navigation locks and dams. The principal agricultural activity in this area is cotton raising. Crossett, Arkansas is the nearest upstream community above the station; this is the site of a pulp mill.

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Station Location: Ouachita River at Rastrop, Louisiana

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Ouachita River

Station at: 32°47' Latitude 91°48' Longitude

Miles above mouth: 215

Activation Date: August 14, 1961

Sampled by: Louisiana Wildlife and Fisheries Commission

Field Analysis by: Louisiana Wildlife and Fisheries Commission
U.S. Public Health Service

Other Cooperating Agencies: Louisiana Stream Control Commission
Louisiana State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Arkansas-Louisiana State line

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 10,787 square miles

Period of record: 1958 to present

Average discharge in record period: –

Maximum discharge in record period: –

Minimum discharge in record period: –

Remarks: Flows affected by operations of Lakes Ouachita, Hamilton, Catherine, and Greeson, and by navigation pools. Records incomplete; discharge computed only when stage is below bank-full.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.27	.25
	Na	56	42
	K	2.2	2.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	160	67
	Cd	*2	*3
	As	*20	*24
	B	95	120
	P	5	36
	Fe	135	156
	Mo	*2	*6
	Mn	*1	*3.6
	Al	–	14
	Be	*.05	*.06
	Cu	67	34
	Ag	*.4	*.6
	Ni	50	*3
	Co	*4	*3
	Pb	*5	*6
	Cr	*1	*6
	V	*2	*12
	Ba	120	96
	Sr	700	360

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.6	.3	April to June	–	–
January to March	–	–	July to September	4.5	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN OUACHITA RIVER

STATION LOCATION OUACHITA RIVER AT

BASTROP, LOUISIANA 85

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA		
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	11 2	-	-	-	-	- -	80	8	19	8	99	11						
10	8	62	11 1	0	1	0	1	0 1	1	10	13	14	14	17						
10	15	62	11 15	-	-	-	-	- -	2	5	18	7	20	9						
10	23	62	11 20	-	-	-	-	- -	7	5	19	6	26	8						
10	29	62	11 21	-	-	-	-	- -	11	6	18	8	29	10						
11	19	62	12 21*	0	0	1	1	1 1	4	6	16	7	20	9						
12	31	62	1 23*	0	0	5	2	5 2	9	6	20	10	29	12						
1	28	63	2 26*	1	1	1	1	2 1	21	7	37	10	58	12						
2	25	63	3 20*	3	2	4	4	7 4	100	17	87	20	187	26						
3	25	63	4 17*	1	1	1	1	2 1	52	9	56	8	108	12						
4	28	63	5 31*	0	1	1	1	1 1	30	4	49	5	79	6						
5	26	63	6 24*	2	1	1	1	3 1	71	4	68	4	139	6						
6	24	63	7 30*	1	1	0	1	1 1	28	13	44	15	72	20						
7	22	63	9 9*	0	1	0	1	0 1	13	6	27	8	40	10						
8	26	63	10 8*	1	1	1	1	2 1	13	6	46	10	59	12						
9	16	63	11 6*	2	1	1	2	3 2	7	12	23	15	30	19						

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN OUACHITA RIVER

STATION LOCATION OUACHITA RIVER AT

BASTROP, LOUISIANA 085

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	PROTOZOA (Identifiable) Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH					ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	57	18	53	15	23	14	92	8	45	40	-	864	21	7	17	5	11	4	22	3	13	3	6	50	1	53	1			0	0
10	15	62	57	11	95	10	65	9	10	6	64	30	-	5											0							0	0
11	5	62	95	18	57	12	56	9	43	6	55	-	-	2											0							0	0
11	19	62	95	13	56	11	57	10	64	6	60	50	-	0											0							0	0
12	3	62	56	22	57	21	92	8	26	7	42	-	-	0											0							0	0
12	17	62										-	-	0											0							0	0
1	7	63	56	73	57	9	82	6	26	2	10	-	-	0											0							0	0
1	21	63	56	15	82	13	70	7	10	5	60	-	-	0											0							0	0
2	4	63	56	58	27	15	82	14	9	7	6	-	-	153	11	5	17	3							0							0	0
2	18	63										-	-	18	11	2									0							0	0
3	4	63	9	31	82	26	56	21	92	6	16	-	-	207	11	6	17	3							0							0	0
3	18	63	56	53	92	18	95	7	62	6	16	-	-	0											0							0	0
4	1	63	56	59	92	11	9	5	89	5	20	-	-	28	17	2	11	1							4	76	1					0	0
4	15	63	56	40	82	25	92	6	95	5	24	-	-	3											0							0	0
5	6	63										-	-	-											-							-	-
5	20	63										-	-	-											-							-	-
6	3	63										-	-	-											-							-	-
6	16	63	64	19	95	10	56	9	70	7	55	-	-	-											-							-	-
8	.5	63										-	-	-											-							-	-
8	26	63										-	-	-											-							-	-
9	2	63										-	-	-											-							-	-
9	15	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN OUACHITA RIVER

STATION LOCATION OUACHITA RIVER AT
BASTROP, LOUISIANA

85

DATE OF SAMPLE			ALGAE (Number per milliliter)										INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS					1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	3700	60	20	170	40	230	2820	210	170	60	40	65	5	51	1																
10	15	62	200	0	10	70	0	30	0	100	20	40	0																				
11	5	62	100	0	0	0	0	0	100	0	0	0	0																				
11	19	62	200	20	20	20	0	20	0	90	50	0	0																				
12	3	62	100	0	0	30	0	0	0	60	30	0	30																				
12	17	62	100	0	0	30	0	20	0	60	30	20	30																				
1	7	63	200	0	0	0	0	40	0	110	70	90	40																				
1	21	63	200	0	0	20	0	0	0	0	180	0	150																				
2	4	63	400	0	0	0	0	60	0	180	180	30	50																				
2	18	63	200	0	0	20	0	70	20	0	130	40	20																				
3	4	63	1700	0	0	90	0	20	240	730	590	110	150	71	3	77	2	65	1														
3	18	63	300	0	0	0	0	20	70	40	150	70	150																				
4	1	63	400	0	0	40	0	40	110	40	130	20	110																				
4	15	63	400	0	20	40	0	90	40	130	90	40	40																				
5	6	63	100	0	0	20	0	20	40	20	0	70	70																				
5	20	63	600	0	0	20	0	290	260	20	0	110	40	64	1	51	1																
6	3	63	300	0	0	40	0	70	110	20	20	20	40																				
6	16	63	600	20	0	20	0	310	70	20	150	20	70	51	1																		
8	5	63	500	0	0	200	0	200	30	30	30	100	200																				
8	26	63	300	20	40	90	0	70	0	70	20	20	40																				
9	2	63	500	20	0	110	0	70	110	170	20	0	130																				
9	15	63	300	0	0	20	0	50	0	160	90	50	90																				

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA
MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN OUACHITA RIVER
STATION LOCATION OUACHITA RIVER AT BASTROP, LOUISIANA 85

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	24.5	7.1	7.6	-	-	-	-	-	79	20	68	25	*25	11	.0	205	-
10	8	62	23.0	6.7	6.8	-	-	-	-	-	140	22	80	30	*25	16	.0	284	-
10	15	62	21.5	6.6	6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	19	62	-	-	7.3	-	-	-	-	-	82	24	52	15	*25	8	.0	221	-
10	22	62	20.0	5.4	7.5	-	-	-	-	-	39	20	36	30	*25	7	.1	113	-
10	29	62	18.5	6.5	7.3	-	-	-	-	-	83	24	72	35	*25	20	.0	-	-
11	5	62	16.0	6.4	7.0	-	-	-	-	-	74	28	52	20	*25	8	.0	205	-
11	12	62	15.5	7.2	8.0	-	-	-	-	-	92	28	60	15	*25	10	.0	146	-
11	19	62	13.0	7.5	8.2	-	-	-	-	-	119	24	72	20	*25	14	.0	320	-
12	3	62	13.0	8.0	7.7	-	-	-	-	-	208	22	96	10	*25	10	.0	520	-
12	17	62	10.6	7.4	8.1	-	-	-	-	-	128	28	76	20	*25	13	.0	275	-
12	31	62	8.0	8.2	7.6	-	-	-	-	-	201	34	112	-	*25	18	.0	415	-
1	7	63	7.0	8.6	7.6	-	-	-	-	-	214	28	92	-	*25	13	.0	415	-
1	14	63	7.0	8.8	7.6	-	-	-	-	-	150	28	76	-	*25	15	.1	315	-
1	21	63	7.0	10.2	7.2	-	-	-	-	-	140	32	100	-	*25	19	.0	340	-
1	28	63	4.0	9.4	7.4	-	-	-	-	-	152	28	136	-	*25	12	.0	306	-
2	4	63	4.0	9.4	7.7	-	-	-	-	-	94	26	56	-	*25	10	.0	225	-
2	11	63	3.0	8.4	7.5	-	-	-	-	-	200	30	100	15	*25	13	.0	400	-
2	18	63	3.0	8.6	7.2	-	-	-	-	-	224	28	104	10	175	15	.0	455	-
2	25	63	8.3	8.4	7.7	-	-	-	-	-	104	16	72	20	*25	16	.0	235	-
3	4	63	11.2	9.6	7.6	-	-	-	-	-	180	8	84	10	*25	13	.0	420	-
3	11	63	16.1	8.4	7.2	-	-	-	-	-	28	18	44	25	*25	13	.0	115	-
3	18	63	17.2	8.2	6.2	-	-	-	-	-	24	20	40	30	*25	8	.0	100	-
3	25	63	20.6	7.4	6.4	-	-	-	-	-	30	16	40	40	*25	12	.0	110	-
4	1	63	20.5	7.4	6.7	-	-	-	-	-	50	12	44	40	*25	13	.0	155	-
4	8	63	17.5	5.0	6.8	-	-	-	-	-	70	24	60	50	*25	15	.0	220	-
4	15	63	17.5	8.0	6.9	-	-	-	-	-	100	20	68	35	*25	31	.0	270	-
4	23	63	22.8	6.4	6.9	-	-	-	-	-	85	36	68	40	*25	16	.0	250	-
4	28	63	23.2	6.2	-	-	-	-	-	-	120	24	68	35	*25	15	.0	270	-
5	6	63	22.8	6.4	6.6	-	-	-	-	-	45	20	40	60	*25	8	.0	128	-
5	13	63	25.0	4.4	7.3	-	-	-	-	-	53	24	48	50	*25	12	.0	148	-
5	20	63	25.1	4.6	6.4	-	-	-	-	-	63	32	56	60	*25	15	.0	195	-
6	3	63	27.8	5.6	6.6	-	-	-	-	-	123	26	68	25	*25	14	.0	320	-
6	9	63	30.2	10.2	8.8	-	-	-	-	-	123	28	76	25	*25	13	.0	270	-
6	16	63	-	-	-	-	-	-	-	-	135	34	80	40	*25	16	.0	310	-
6	24	63	30.0	4.8	6.4	-	-	-	-	-	132	30	76	30	*25	21	.0	350	-
7	1	63	30.0	4.0	6.0	-	-	-	-	-	165	44	100	30	*25	18	.0	410	-
7	8	63	31.0	6.4	6.2	-	-	-	-	-	176	38	112	25	*25	19	.0	440	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN OUACHITA RIVER

STATION LOCATION OUACHITA RIVER AT BASTROP, LOUISIANA 85

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	17	63	30.0	3.0	6.8	-	-	-	-	-	280	28	148	35	*25	20	.0	600	-
7	22	63	30.0	5.0	6.4	-	-	-	-	-	26	20	40	5	*25	16	.0	100	-
8	5	63	-	-	-	-	-	-	-	-	82	20	60	60	*25	19	.0	230	-
8	26	63	-	-	-	-	-	-	-	-	192	22	104	25	*25	21	.0	460	-
9	2	63	-	-	-	-	-	-	-	-	130	22	76	10	*25	16	.0	330	-
9	16	63	-	-	-	-	-	-	-	-	168	32	84	25	*25	25	.0	390	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Arkansas-Louisiana State Line
Operated by U.S. Geological Survey

STATE: Louisiana

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Ouachita River

STATION LOCATION: Ouachita River at Bastrop, Louisiana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	2.380	6.000	6.200	2.650	3.510	2.350	15.200	13.000	1.130	.902	2.010	1.290
2	2.380	4.910	7.130	2.940	3.550	3.370	11.600	15.700	1.120	.961	2.040	1.340
3	2.030	5.170	7.390	3.440	3.410	6.150	3.570	16.300	1.060	.925	2.080	1.200
4	1.610	5.270	7.250	3.670	3.300	9.910	6.730	16.900	.987	.856	2.030	.800
5	1.760	5.270	6.450	3.540	3.080	14.100	5.780	17.200	.882	.725	1.660	.690
6	1.970	5.280	5.590	3.400	2.810	15.000	4.590	17.600	.724	.602	1.060	.754
7	2.120	5.170	4.600	3.430	2.220	15.800	4.410	17.400	.686	.556	.789	.782
8	2.800	4.910	3.870	3.570	1.820	16.000	4.410	16.600	.645	.690	.927	.773
9	3.080	4.680	2.970	4.350	1.710	16.300	6.120	15.300	.617	.783	.975	.869
10	3.380	4.700	2.560	5.190	1.670	16.400	8.420	13.000	.636	.769	1.010	.836
11	5.000	5.350	2.680	5.460	1.650	16.300	9.010	11.300	.582	.709	1.020	.836
12	6.140	6.290	2.750	5.080	1.820	15.700	8.680	8.000	.494	.695	1.110	.816
13	6.930	6.680	2.870	4.720	2.130	15.000	7.000	6.000	.499	.760	1.230	.836
14	7.050	6.650	2.870	4.220	2.950	15.300	5.680	4.010	.506	.794	1.180	.956
15	6.720	6.520	3.240	3.490	4.240	15.800	5.000	2.800	.508	.949	1.040	1.070
16	6.160	6.010	3.690	3.070	4.890	16.300	3.810	2.050	.563	1.000	.872	1.010
17	5.720	5.790	3.760	3.140	4.990	16.800	3.610	1.760	.597	3.000	.916	1.030
18	7.000	5.540	3.440	3.260	4.740	17.400	3.020	1.780	.608	4.000	1.020	.966
19	11.000	5.330	3.010	3.370	4.760		2.370	1.780	.724	6.000	.941	.886
20	12.800	5.220	2.550	3.480	4.610		2.040	1.790	1.020	9.150	.900	.751
21	13.100	5.210	2.230	3.460	4.150		1.780	1.550	.932	10.200	.843	.732
22	13.100	5.210	2.180	3.220	3.600		2.020	1.250	.960	10.000	.785	.651
23	12.700	5.210	2.140	2.910	3.330		2.100	1.100	.904	8.000	.671	.628
24	11.000	5.360	2.400	3.030	2.760		2.300	.986	.981	5.600	.552	.583
25	10.900	5.490	2.590	3.150	2.490		2.320	1.120	1.080	5.610	.590	.529
26	11.000	5.600	2.690	3.390	2.360		1.860	1.180	1.020	5.000	.587	.550
27	10.500	5.570	2.690	3.570	2.320		1.340	1.240	1.030	4.050	.584	.536
28	8.000	4.000	2.640	3.590	2.290		1.440	1.370	.959	4.670	.648	.601
29	7.640	3.530	2.630	3.790			4.000	1.350	.927	4.090	.639	.650
30	7.280	4.660	2.570	3.870			9.000	1.210	.945	3.390	1.220	.719
31	6.920		2.520	3.720		15.600		1.170		3.000	1.200	

Note: Stage above 19.0 ft. March 19-30; no discharge record computed.

RED RIVER AT ALEXANDRIA, LOUISIANA

This Pollution Surveillance station monitors the quality of the Red River before discharge into the Atchafalaya River system. Samples are collected from U.S. Highway 165 Bridge. Chloride concentrations at this river location may at times exceed the Public Health Service Drinking Water Standards. Organic pollution is the principal problem at this station. Bossier City, Shreveport, Alexandria, and Pineville, Louisiana discharge raw sewage from a total of about 238,000 people to the Red River above this station. Barksdale AFB at Shreveport and England AFB at Alexandria contribute raw sewage from approximately 8,500 and 5,000 persons, respectively. Three miles above the station the Veterans Administration Hospital discharges raw waste from a population of 500.

The diatom Stephanodiscus astraea comprised 96% of the diatoms from this station on June 1. Diatoms comprised 38% of the total algae count which was composed of several genera of blue greens, greens and flagellates.

The August 19 sample was characterized by the dominance of the diatom Coscinodiscus which represented 91% of diatoms. A large variety of green algae and a large population of rotifers numbering 2,832 per liter was unusual for this station.

The summertime dominance of the diatoms Stephanodiscus astraea and Coscinodiscus together with large varieties of green algae and large rotifer populations reflect the organic loadings discharged upstream. The September 3 rotifer population of 15,190 per liter was the highest ever recorded at a System station.

Station Location: Red River at Alexandria, Louisiana

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Red River below Denison

Station at: 31°19' Latitude 92°26' Longitude

Miles above mouth: 121

Activation Date: November 18, 1957

Sampled by: Alexandria Water Department

Field Analysis by: Louisiana State Department of Health, Alexandria Laboratory

Other Cooperating Agencies: Louisiana State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: At Alexandria, Louisiana

Gaging station operated by: U.S. Army Corps of Engineers

Drainage area at gaging station: 67,500 square miles

Period of record: 1928 to present

Average discharge in record period: 32,530 cfs.

Maximum discharge in record period: 233,000 cfs.

Minimum discharge in record period: 873 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-1-63	0.08
7-8-63	0.07
7-15-63	0.10
7-29-63	0.07
8-12-63	0.13
8-19-63	0.11
9-3-63	0.08
9-9-63	0.06
9-23-63	0.11
9-30-63	0.12

ELEMENTAL ANALYSES

		Composite 10/1/62 to 12/31/62	Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.36	.30
	Na	78	73
	K	3.8	4.7
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*8	*4
	Cd	*4	*4
	As	*40	*40
	B	76	60
	P	*10	30
	Fe	58	22
	Mo	*4	22
	Mn	*2	*4
	Al	–	20
	Be	*.1	*.1
	Cu	*4	*4
	Ag	*.8	*1
	Ni	*4	*4
	Co	*8	*4
	Pb	*10	*10
	Cr	*2	*10
	V	*14	*20
	Ba	56	86
	Sr	740	250

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	3.9	.6	April to June	4.0	.4
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT
ALEXANDRIA, LOUISIANA 42

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	11	2	0	2	0	1	0	2	74	38	34	20	108	43						
10	8	62	11	1	-	-	-	-	-	-	7	12	22	16	29	20						
10	15	62	12	14	-	-	-	-	-	-	41	30	16	17	57	34						
10	22	62	11	8	-	-	-	-	-	-	43	21	9	8	52	22						
10	29	62	12	20	-	-	-	-	-	-	42	20	13	8	55	22						
11	26	62	12	12*	4	6	0	2	4	6	122	67	31	15	153	69						
12	17	62	1	23*	13	8	1	2	14	8	94	47	23	16	117	50						
1	28	63	2	21*	2	2	0	2	2	3	43	10	30	10	73	14						
2	25	63	3	18*	1	2	2	3	3	3	44	7	38	8	82	11						
3	25	63	4	17*	1	2	0	1	1	2	88	19	25	8	113	21						
4	29	63	5	22*	2	2	1	2	3	3	66	16	47	15	113	22						
5	27	63	6	19*	4	4	1	1	5	4	74	39	48	9	122	40						
6	24	63	7	24*	0	1	0	3	0	3	6	6	48	28	54	29						
7	29	63	8	16*	1	1	1	2	2	2	12	7	37	17	49	18						
8	26	63	9	25*	1	1	4	3	5	3	9	5	43	16	52	17						
9	30	63	10	23*	0	1	3	4	3	4	4	6	26	28	30	29						

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT ALEXANDRIA, LOUISIANA 042

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Flagellates) (Number per ml.)	ROTIFERS										CRUSTACEA								NEMATODES (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)										GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL	4TH GENUS	4TH COUNT LEVEL	5TH GENUS	5TH COUNT LEVEL	NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL		
10	15	62	58	40	26	24	53	5	18	3	28		-	80	2	4	11	1	17	1	22	1			0							2	0
11	1	62	18	17	26	10	92	6	58	5	62		-	41	11	2	22	2							6	76	2					0	0
11	14	62	26	29	92	9	53	9	56	6	47		-	0											0							0	0
12	3	62											-	-																		-	-
12	14	62										80	-	2											0							0	0
1	7	63											-	0											0							0	0
1	15	63											-	-																		-	-
2	4	63											-	0											0							0	0
2	15	63	80	98	57	1					1		-	0											0							0	0
3	1	63	82	79	26	6	70	3	71	2	10		-	0											0							0	0
3	18	63	80	25	92	24	20	4	9	3	44		-	0											0							66	0
4	1	63	92	34	26	18	56	11	80	5	32		-	0											0							0	0
4	17	63	82	72	38	10	57	5	26	4	9		-	0											0							0	0
5	1	63	26	43	38	19	80	15	57	7	16		-	27	11	2	2	1							6	50	2					0	0
5	15	63	82	48	59	32	83	8	9	4	8		-	28	11	3									0							0	0
6	1	63	80	96	26	1					3		-	2											3							0	0
6	14	63	26	40	38	13	30	13	58	9	25		-	293	2	1	11	5	17	3					0							0	0
6	29	63	16	76	26	9	27	4	82	4	7		-	353	22	5	7	5	2	4	17	3	11	3	2							0	0
7	15	63	18	82	26	12					6	0	-	414	22	8	15	4	17	4	2	3	11	1	0							1	0
8	1	63	18	96	26	2	82	1			1		-	-																		-	-
8	19	63	9	91	26	2					7		-	1160	11	7	2	7	22	6	17	5	21	3	0							0	0
9	3	63	69	42	18	21	26	12	67	9	16		-	2830	11	8	22	8	2	7	17	6	18	4	0							0	0
9	16	63	18	49	91	31	38	3	26	3	14		-	12690	22	9	11	9	17	7	2	5	9	5	0							0	390
																																0	0

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT

ALEXANDRIA, LOUISIANA 42

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per mL. (See first for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	15	62	7100	60	120	700	0	710	20	1370	4140	1120	790	86	4	88	3	68	3	87	2	83	2	25	1	38	1	52	1	69	1	91	1
11	1	62	2200	0	0	250	0	370	20	700	870	120	80	67	2	69	1	52	1	92	1												
11	14	62	500	0	30	140	0	50	0	150	140	60	150																				
12	3	62	00	0	0	0	0	0	0	0	30	0	200																				
12	14	62	100	0	0	0	0	0	0	50	20	20	80																				
1	7	63	100	0	20	0	0	20	0	30	60	20	80																				
1	15	63	300	0	0	40	0	40	0	90	130	0	200																				
2	4	63	200	0	0	20	0	30	0	90	50	20	60																				
2	15	63	8300	40	0	480	0	1340	3850	2380	200	480	220	65	5	71	4	51	4	60	2												
3	1	63	7100	90	180	420	0	1630	2350	1910	550	840	400	65	4	71	4	51	4	88	1	64	1	17	1	35	1	87	1				
3	18	63	800	0	20	40	0	130	110	170	290	130	250																				
4	1	63	200	0	0	0	0	20	0	110	70	90	90																				
4	17	63	9300	40	20	590	0	310	180	6120	2070	1280	880	71	6	83	3	69	2	88	2	92	2	68	2	52	1	26	1	35	1		
5	1	63	9100	0	360	2790	40	290	170	4160	1320	800	230	68	5	35	3	83	3	71	3	26	2	38	2	41	1	51	1	17	1	69	1
5	15	63	600	0	0	20	0	20	20	440	70	70	220	71	2																		
6	1	63	3900	0	400	1470	0	110	40	1410	440	920	320	71	4	26	3	35	2	11	1												
6	14	63	18100	1940	3010	2960	0	770	50	5090	4320	380	930	68	5	83	5	11	4	9	3	92	3	24	3	44	3	2	3	55	3	88	3
6	29	63	5400	150	170	1610	0	0	20	2980	500	830	430	67	5	34	3	68	2	38	2	83	1	11	1	45	1						
7	15	63	9400	120	660	1060	0	60	0	5490	2050	520	250	67	6	68	3	35	2	38	1												
8	1	63	4400	80	20	850	0	0	0	3230	210	370	310	67	5	35	1																
8	19	63	5600	60	370	1950	0	100	20	2690	370	580	40	67	5	36	2	35	2	45	2												
9	3	63	16300	600	3640	3790	0	240	20	2410	5830	1010	4020	92	5	17	5	68	3	67	3	88	3	24	3	11	3	35	3	38	2	25	2
9	16	63	28300	500	660	2230	0	110	0	1190	23510	630	6640	92	7	67	5	88	5	83	4	87	3	35	3	97	2	17	2	1	2	68	2

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE: LOUISIANA

MAJOR BASIN: SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN: LOWER RED RIVER BELOW DENISON

STATION LOCATION: RED RIVER AT ALEXANDRIA, LOUISIANA

42

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
BEGINNING			END								NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
12	7	62	12	15	5080	157	44	113	0	11	18	2	2	14	0	5	2	1	7
2	4	63	2	12	5270	159	29	130	1	6	12	1	1	10	0	3	1	1	5
3	4	63	3	15	4220	182	51	131	2	11	19	2	2	15	0	7	4	1	7
6	4	63	6	12	5280	113	37	76	1	9	15	1	1	12	1	5	2	1	4
8	15	63	8	26	6380	139	39	100	0	10	15	1	1	13	0	6	2	1	5

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT
ALEXANDRIA, LOUISIANA 42

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale co.-pt.)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	25.0	8.1	7.4	-	18	2.1	6.8	.1	171	118	236	20	164	101	.1	595	5300
10	8	62	27.0	7.9	7.9	-	19	2.4	7.8	.1	176	106	223	20	128	84	.1	602	5300
10	15	62	28.0	7.3	7.8	-	16	2.0	6.5	.1	106	75	136	30	204	56	.1	376	13000
10	22	62	23.0	6.2	7.6	-	24	2.3	7.6	.1	70	75	124	30	700	48	.1	281	20000
10	29	62	21.0	8.3	7.7	-	21	2.4	7.2	.1	72	65	109	40	300	44	.1	283	3400
11	5	62	15.0	8.5	7.7	-	23	2.2	7.2	.1	115	72	153	20	570	-	.1	422	47000
11	19	62	15.0	9.0	7.7	-	21	2.6	7.5	.1	99	78	138	40	188	58	.1	376	14000
11	26	62	15.0	9.8	7.7	-	56	2.0	7.9	.2	121	105	165	40	74	56	.1	433	9400
12	3	62	15.0	6.9	7.6	-	54	1.7	7.4	.2	74	85	132	40	1700	46	.1	312	24000
12	10	62	12.0	9.2	7.2	-	27	3.2	8.6	.2	105	68	146	30	610	63	.1	381	33000
12	17	62	9.0	10.8	7.7	-	22	2.9	7.6	.2	130	75	157	30	460	74	.1	436	42000
1	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42000
1	7	63	10.0	10.1	7.5	-	26	3.6	7.9	.2	98	64	131	40	230	46	.1	361	-
1	14	63	7.0	10.8	7.8	-	24	2.8	7.7	.1	87	62	120	40	240	50	.1	314	48000
1	21	63	5.0	11.7	7.6	-	20	2.4	7.4	.2	94	71	131	40	152	53	.1	332	35000
1	28	63	3.0	13.0	7.7	-	19	2.9	7.0	.2	131	92	171	30	120	74	.1	459	55000
2	4	63	8.0	11.3	7.7	1.2	17	3.3	6.9	.1	174	101	223	30	164	104	.2	599	40000
2	11	63	10.0	10.8	7.8	1.6	17	3.0	5.9	.1	172	110	219	30	108	109	.1	588	-
2	18	63	10.0	11.6	7.8	-	9	4.0	9.0	.1	159	134	232	40	150	80	.1	567	43000
2	25	63	11.0	11.0	7.5	2.6	29	3.5	9.1	.2	111	95	164	40	134	61	.1	404	1000
3	4	63	17.0	9.4	7.6	2.1	22	3.8	10.0	.2	86	116	159	50	128	33	.1	347	6000
3	11	63	18.0	9.0	7.6	1.1	22	2.9	9.7	.1	50	60	82	50	148	-	.1	213	9100
3	19	63	19.0	8.0	7.6	1.3	23	2.3	9.6	.1	73	67	116	30	270	44	.1	283	18000
3	25	63	19.0	8.2	7.8	-	22	2.8	8.9	.2	33	58	76	50	245	17	.1	173	16000
4	1	63	21.0	8.0	7.7	1.0	21	3.0	8.3	.2	38	58	78	50	335	17	.1	168	11000
4	8	63	20.0	8.4	7.6	1.1	22	2.9	8.1	.1	52	69	96	30	300	24	.1	222	13000
4	22	63	26.0	7.9	7.7	1.7	20	2.6	7.3	.1	101	93	158	30	70	59	.1	385	7000
4	29	63	26.0	8.4	7.7	-	17	2.8	6.4	.1	162	152	228	20	60	94	.1	584	7900
5	6	63	25.0	6.4	7.7	1.7	41	3.7	10.8	.2	43	64	90	60	1080	19	-	192	25000
5	13	63	25.0	6.6	7.7	1.0	23	3.1	8.3	.1	60	59	90	40	520	20	.1	223	-
5	20	63	28.0	7.1	7.6	1.5	24	2.7	6.9	.2	73	65	102	30	160	34	.1	265	-
5	27	63	30.0	7.5	8.0	1.8	19	2.6	6.4	.1	106	109	180	20	92	-	.1	415	4900
6	3	63	30.0	7.2	7.8	1.7	16	2.4	6.7	.2	180	134	264	20	64	124	-	663	3500
6	10	63	32.0	8.0	8.3	3.1	12	2.9	8.1	.0	148	140	236	20	54	96	.1	583	-
6	17	63	31.0	7.4	8.0	4.5	27	2.7	7.9	.1	156	138	252	20	52	111	.1	620	5500
6	24	63	31.0	8.4	8.3	3.3	15	2.6	6.8	.1	195	171	296	10	32	127	.1	741	2800
7	8	63	32.0	8.5	8.3	3.6	22	2.4	6.8	.1	118	140	216	20	30	63	.1	484	2800
7	15	63	31.0	8.5	8.1	4.7	18	2.5	7.7	.1	256	119	296	20	24	89	.0	857	4100

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT ALEXANDRIA, LOUISIANA 42

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	22	63	33.0	5.6	7.8	1.6	20	3.7	7.7	.1	148	80	152	20	300	49	.1	455	6200
7	29	63	31.0	7.6	7.5	1.7	24	3.7	8.1	.1	129	58	123	20	245	34	.0	388	3000
8	12	63	31.0	7.3	8.4	2.1	21	2.9	6.9	.1	105	85	146	20	60	–	.1	398	13000
9	9	63	31.0	–	8.2	–	20	3.8	8.7	.1	257	88	216	20	49	90	.1	764	8000
9	16	63	29.0	7.1	8.0	3.6	18	3.2	7.8	.1	250	97	220	20	46	98	.1	747	10000
9	23	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	30	63	23.0	8.4	8.0	6.9	25	2.9	7.6	.1	236	194	340	20	51	141	.1	845	5000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Alexandria, Louisiana
Operated by U.S. Army Corps of Engineers

STATE: Louisiana

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Red River below Denison

STATION LOCATION: Red River at Alexandria, Louisiana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	12.600	12.200	23.800	20.800	11.100	7.290	20.300	10.600	6.250	6.420	8.810	2.920
2	12.200	12.400	48.000	19.300	11.000	8.180	19.700	22.300	6.250	6.140	8.190	2.980
3	11.600	18.700	52.200	17.900	11.000	8.660	17.400	45.100	6.550	5.800	7.890	2.990
4	10.700	27.400	50.200	16.800	11.100	9.080	14.900	50.600	6.710	5.370	7.890	3.110
5	9.900	28.100	46.200	16.200	11.000	9.310	13.300	51.300	6.930	5.170	7.890	3.290
6	10.000	25.700	40.700	15.600	10.700	10.700	12.300	48.900	6.930	5.080	7.710	3.590
7	11.200	23.200	36.700	15.400	10.500	13.500	12.300	45.600	6.930	5.170	8.190	4.530
8	14.200	20.800	35.500	15.200	10.200	16.500	12.100	41.300	6.780	5.170	8.810	5.710
9	16.200	18.100	35.500	15.900	9.920	17.500	12.100	36.800	6.550	5.300	8.750	6.280
10	15.300	16.200	33.800	19.300	9.550	17.200	11.800	32.700	6.170	5.370	8.500	6.490
11	13.100	14.800	30.400	24.200	9.140	17.200	11.900	28.700	5.850	5.500	7.790	6.280
12	11.400	14.500	27.700	26.600	8.990	18.000	12.600	25.200	5.500	5.500	7.300	5.850
13	10.800	15.300	25.400	25.200	8.800	18.900	13.900	22.100	5.100	5.370	6.650	5.500
14	10.300	15.900	24.500	23.400	8.500	18.700	14.200	19.100	4.800	5.300	6.010	5.000
15	10.000	16.200	23.500	21.000	8.350	18.900	13.200	17.300	4.730	5.080	5.250	4.510
16	10.200	15.600	22.600	19.300	7.940	22.700	12.900	16.100	4.800	4.880	4.510	4.400
17	10.800	14.800	22.000	18.200	7.240	28.400	12.000	15.200	5.100	4.710	4.080	4.730
18	15.300	13.500	21.300	17.400	8.500	30.400	11.400	13.800	5.220	5.210	4.000	4.730
19	30.000	12.400	20.800	16.600	10.200	29.700	10.800	12.700	5.220	8.180	4.000	4.510
20	37.700	11.800	20.500	16.300	12.700	30.400	10.700	11.700	5.100	10.100	4.000	3.800
21	38.900	11.600	19.800	16.000	12.700	29.000	10.400	10.400	4.730	10.900	4.000	3.230
22	34.700	11.100	18.700	15.700	11.700	28.000	10.200	9.350	4.500	11.300	3.500	2.880
23	30.700	10.700	18.700	15.400	10.500	27.000	9.720	8.450	4.730	11.900	3.320	2.750
24	26.400	10.500	19.500	14.900	9.890	25.700	9.120	7.750	5.130	12.200	3.190	2.750
25	22.900	10.300	17.200	14.300	9.230	26.500	8.520	7.460	5.840	12.000	3.150	2.750
26	21.100	10.500	16.500	14.000	8.450	30.000	8.200	7.350	6.830	11.700	3.150	2.650
27	20.500	10.500	15.300	13.300	7.680	32.800	8.080	7.240	7.160	11.200	3.110	2.490
28	20.200	10.200	15.900	12.800	7.290	30.500	8.300	7.350	6.950	10.700	2.990	2.230
29	18.900	10.000	19.800	12.200		26.700	8.520	7.350	6.830	10.500	2.920	2.100
30	16.200	11.600	22.400	12.000		22.900	8.750	7.120	6.630	10.200	2.920	2.000
31	14.000		22.400	11.500		20.600		6.550		9.690	2.920	

RED RIVER AT BOSSIER CITY, LOUISIANA

Samples are collected from the intake of the municipal water treatment plant. This station is located approximately 35 miles below the Arkansas-Louisiana State line.

Bossier City is the only municipality known to draw its supply from the Red River. The variability of mineral concentration has required the installation of a reservoir and a plan to pump from the river only at times when satisfactory quality prevails.

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Station Location: Red River At Bossier City, Louisiana

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Red River Below Denison

Station at: 32°29' Latitude 93°45' Longitude

Miles above mouth: 310

Activation Date: June 18, 1962

Sampled by: Bossier City Department of Water and Sewage

Field Analysis by: Bossier City Department of Water and Sewage
U.S. Public Health Service

Other Cooperating Agencies: Louisiana Stream Control Commission
Louisiana State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: At Shreveport, Louisiana

Gaging station operated by: U.S. Army Corps of Ingineers

Drainage area at gaging station: 60,613 square miles

Period of record: 1928 to present

Average discharge in record period: 25,420 cfs.

Maximum discharge in record period: 303,000 cfs.

Minimum discharge in record period: 690 cfs.

Remarks: Flows affected by operations of Lake Texoma (Denison Dam) and Texarkana Reservoir.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-2-63	0.05
7-9-63	0.07
7-30-63	0.07
8-7-63	0.03
8-14-63	0.06
8-22-63	0.06
9-3-63	0.04
9-10-63	0.03
9-17-63	0.09

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.20	.20
	Na	53	63
	K	3.9	4.3
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	88	*5
	Cd	*3	*5
	As	*32	*48
	B	69	26
	P	*8	*24
	Fe	134	12
	Mo	*3	*24
	Mn	*1.6	*4.7
	Al	–	*24
	Be	*.08	*.12
	Cu	16	*5
	Ag	*.6	*1.2
	Ni	*3	*5
	Co	*6	*5
	Pb	*8	*12
	Cr	*2	*12
	V	*13	*24
	Ba	*130	79
	Sr	592	191

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.0	.3	April to June	–	–
January to March	–	–	July to September	5.0	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE LOUISIANA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT

BOSSIER CITY, LOUISIANA 118

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	9	62	11	29	1	4	0	1	1	4	38	30	15	9	53	31						
10	23	62	11	21	0	0	0	0	0	0	11	7	17	8	28	11						
10	30	62	11	26	2	2	2	1	4	2	8	3	16	5	24	6						
11	6	62	11	28	9	8	0	1	9	8	339	25	20	7	359	26						
11	27	62	12	15	7	3	8	4	15	5	297	18	79	14	376	23						
12	4	62	1	2	2	9	1	1	3	9	244	61	38	6	282	61						
12	11	62	1	7	7	9	2	2	9	9	155	45	40	9	195	46						
1	22	63	2	1	1	2	1	2	2	2	58	14	49	15	107	21						
2	12	63	3	1	0	1	1	4	1	4	36	14	28	19	64	24						
2	19	63	3	7	0	1	0	3	0	3	28	13	55	19	83	22						
2	26	63	3	15	0	1	0	1	0	1	7	10	101	15	108	18						
3	6	63	3	22	5	4	0	1	5	4	157	22	41	8	198	22						
3	12	63	3	28	1	1	0	1	1	1	55	7	40	7	95	10						
3	20	63	4	1	3	5	0	1	3	5	143	20	50	4	193	20						
3	26	63	4	8	5	4	0	1	5	4	169	12	44	4	213	13						
4	16	63	6	3*	4	3	1	1	5	3	133	9	46	4	179	10						
5	29	63	7	1*	3	5	0	2	3	5	125	20	52	8	177	22						
6	25	63	8	6*	1	1	1	3	2	3	21	13	48	18	69	22						
7	30	63	9	9*	5	3	0	3	5	4	41	5	42	9	83	12						
8	22	63	10	14*	1	1	2	3	3	3	8	4	32	10	40	11						
9	16	63	11	20*	0	2	0	7	0	7	5	4	35	22	40	22						

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT BOSSIER CITY, LOUISIANA 118

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																	
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS										CRUSTACEA						NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	9	62	58	31	38	27	26	11	82	3	28			0											0						0	0
11	20	62	26	35	57	24	56	11	56	11	19			0											0						0	0
12	4	62												0											0						0	0
12	11	62												0											0						0	0
12	26	62	38	64	56	2	65	2	71	1	11			0											0						0	0
1	22	63	82	38	57	11	38	6	64	5	40			0											0						0	0
2	19	63	80	83	92	7	51	1	71	1	8			0											0						0	0
3	6	63												0											0						0	0
3	20	63	71	26	72	9	20	7	92	7	51			18	17	2									0						1	0
4	2	63	92	51	58	8	56	3	55	3	35			0											0						0	0
4	16	63												159	11	5	17	3	15	1					0						0	0
5	7	63												-											-						-	-
5	21	63	80	77	26	10	56	4	82	2	7			-											-						-	-
6	3	63	26	32	38	27	80	15	18	13	13			-											-						-	-
6	18	63	18	38	26	22	56	8	67	6	26			-											-						-	-
7	2	63	82	26	26	22	18	16	38	12	24	330		-											-						-	-
7	9	63	26	31	18	24	38	12	67	7	20			-											-						-	-
8	7	63	18	94	26	2					4			-											-						-	-
8	19	63	18	55	56	8	82	5	47	4	28			11	22	1									1						0	0
9	3	63	91	52	18	20	26	13	70	5	10			-											-						-	-
9	16	63	91	52	26	13	82	6	84	6	23			-											-						-	-

PLANKTON POPULATION

STATE LOUISIANA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT
BOSSIER CITY, LOUISIANA

118

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GEN.	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	9	62	1300	30	170	200	0	0	30	210	660	90	240	83	2	68	1																
11	20	62	5200	20	50	1580	0	200	20	2860	450	720	340	69	4	68	4	35	3	51	1												
12	4	62	100	0	20	0	0	0	0	50	50	20	60																				
12	11	62	200	0	20	20	0	20	0	0	150	0	130																				
12	26	62	1800	0	0	290	0	220	0	570	730	150	550	83	3	68	2	51	1														
1	22	63	200	0	0	20	0	40	0	70	110	40	70																				
2	19	63	13700	80	210	670	0	2980	5120	4450	170	1810	290	63	5	71	5	51	5	62	3	26	1	17	1	30	1						
3	6	63	500	0	0	0	0	40	150	130	130	40	330																				
3	20	63	600	0	20	20	0	70	70	260	130	70	130	69	1																		
4	2	63	500	0	0	0	0	90	90	220	90	130	370																				
4	16	63	8300	0	840	2140	0	550	670	3380	690	1580	420	17	3	65	3	26	3	24	2	51	2	38	2	69	1	25	1				
5	7	63	100	0	0	0	0	0	0	70	20	40	200																				
5	21	63	1700	20	0	290	0	90	0	810	530	420	110	71	2	88	2																
6	3	63	3200	20	90	810	0	20	20	1190	1010	400	220	83	3	68	3	35	2	71	1	67	1	29	1								
6	18	63	4700	130	530	1360	0	570	0	1430	660	1100	1500	67	3	68	2	11	2	88	2	26	1	51	1	35	1	38	1	83	1	52	1
7	2	63	11000	110	1250	4690	0	240	200	1500	2970	730	330	35	4	92	4	83	3	11	3	26	3	88	2	38	2	17	2	25	1	62	1
7	9	63	12400	0	3450	4990	0	70	20	1360	2530	860	750	11	5	88	4	24	4	68	3	35	3	25	3	83	3	15	3	30	3	38	2
8	7	63	9400	0	40	900	0	70	40	7920	400	530	350	67	6	35	2	38	1	68	1												
8	19	63	300	0	0	70	0	0	0	170	20	170	240																				
9	3	63	33200	780	1040	4330	0	90	0	970	12810	650	1980	92	7	17	6	11	6	25	3	38	3	35	3	67	2	3	2	68	2	44	1
9	16	63	28800	1060	12440	3020	0	390	0	810	11070	140	1940	92	6	88	4	35	3	3	3	17	3	83	2	38	2	68	2	71	2	25	2

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE LOUISIANA

MAJOR BASIN SOUTHWEST–LOWER MISSISSIPPI RIVER

MINOR BASIN **LOWER RED RIVER BELOW DENISON**

STATION LOCATION RED RIVER AT

BOSSIER CITY, LOUISIANA 118

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	9	62	–	–	7.7	–	–	–	–	–	77	72	124	15	230	55	.0	387	–
10	23	62	–	–	8.0	–	–	–	–	–	64	76	108	10	240	35	.0	247	100
10	30	62	–	–	7.7	–	–	–	–	–	60	66	120	15	*25	53	.0	268	2000
11	5	62	–	–	8.0	–	–	–	–	–	30	66	76	15	350	15	.0	160	–
11	6	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2000
11	27	62	–	–	8.2	–	–	–	–	–	120	100	205	5	*25	92	.0	520	4500
12	4	62	–	–	8.0	–	–	–	–	–	38	74	120	15	700	45	.0	232	–
12	11	62	–	–	8.0	–	–	–	–	–	60	82	136	15	380	55	.0	315	3500
1	22	63	–	–	7.8	–	–	–	–	–	102	100	188	–	*25	85	.0	455	*8
2	12	63	–	–	7.7	–	–	–	–	–	150	146	260	10	*25	120	.0	610	1000
2	19	63	–	–	7.6	–	–	–	–	–	142	120	224	5	*25	100	.0	520	–
2	26	63	–	–	7.8	–	–	–	–	–	92	180	240	0	*25	60	.0	435	–
3	6	63	–	–	7.4	–	–	–	–	–	34	68	120	20	320	15	.0	172	–
3	12	63	–	–	7.7	–	–	–	–	–	32	92	100	15	85	25	.0	192	–
3	20	63	–	–	6.9	–	–	–	–	–	18	60	84	20	220	115	.0	187	–
3	26	63	–	–	7.2	–	–	–	–	–	24	60	88	20	320	100	.0	128	–
4	2	63	–	–	7.0	–	–	–	–	–	64	64	92	20	310	25	.0	160	–
4	16	63	–	–	7.4	–	–	–	–	–	94	96	168	5	125	82	.0	380	–
5	2	63	–	–	–	–	–	–	–	–	40	104	128	20	800	35	.0	230	–
5	7	63	–	–	–	–	–	–	–	–	22	76	92	25	420	17	.0	140	–
5	14	63	–	–	–	–	–	–	–	–	52	80	120	10	150	38	.0	210	–
5	21	63	–	–	–	–	–	–	–	–	106	124	210	5	*25	90	.0	490	–
5	29	63	–	–	–	–	–	–	–	–	148	136	250	10	*25	150	.0	670	–
6	3	63	–	–	–	–	–	–	–	–	260	132	220	5	*25	105	.0	490	–
6	11	63	–	–	–	–	–	–	–	–	136	144	250	5	*25	105	.0	530	–
6	25	63	–	–	–	–	–	–	–	–	194	98	250	5	*25	142	.1	660	–
7	2	63	–	–	–	–	–	–	–	–	150	136	290	0	*25	120	.0	600	–
7	9	63	–	–	–	–	–	–	–	–	260	120	370	5	*25	250	.0	900	–
7	17	63	–	–	–	–	–	–	–	–	65	66	140	20	480	50	.0	230	–
7	30	63	–	–	–	–	–	–	–	–	230	118	300	10	*25	160	.0	720	–
8	7	63	–	–	–	–	–	–	–	–	105	84	210	10	*25	70	.0	380	–
8	14	63	–	–	–	–	–	–	–	–	200	130	280	10	*25	118	.0	720	–
8	22	63	–	–	–	–	–	–	–	–	155	132	330	5	*25	175	.0	860	–
9	3	63	–	–	–	–	–	–	–	–	250	124	360	0	*25	175	.0	840	–
9	10	63	–	–	–	–	–	–	–	–	280	116	340	0	*25	215	.0	910	–
9	18	63	–	–	–	–	–	–	–	–	290	156	370	5	*25	225	.0	980	–

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Shreveport, Louisiana
Operated by U.S. Geological Survey

STATE: Louisiana

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Red River below Denison

STATION LOCATION: Red River at Bossier City, Louisiana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	8.340	17.400	59.700	13.800	9.860	5.390	14.900	40.100	6.460	4.290	6.280	3.020
2	7.460	29.500	54.200	13.500	10.100	5.390	13.100	52.600	6.860	3.710	6.280	3.020
3	8.120	30.800	44.500	13.100	9.860	6.090	11.200	53.500	7.080	3.420	6.090	2.880
4	8.780	26.900	38.200	13.500	9.620	8.660	9.860	49.000	6.650	4.000	6.860	2.750
5	12.900	22.800	34.800	13.500	9.380	13.500	8.430	41.900	6.650	4.440	8.900	3.290
6	19.200	19.600	34.200	13.100	8.900	16.300	7.960	36.300	6.280	4.440	8.900	3.850
7	19.200	17.900	34.800	13.500	8.430	15.800	7.510	31.200	5.720	4.440	8.430	3.710
8	15.800	15.500	35.500	17.700	7.960	14.500	7.720	27.800	5.390	4.600	7.510	3.420
9	13.200	14.500	30.800	25.800	7.510	14.900	9.620	23.900	4.900	4.600	6.650	3.020
10	11.800	14.500	27.500	27.800	7.080	16.700	11.200	21.000	4.440	4.290	5.910	2.630
11	10.700	15.800	24.500	25.800	6.460	15.800	12.100	18.200	4.290	4.290	5.390	2.140
12	10.400	16.500	22.800	22.100	6.090	14.500	12.100	15.800	4.290	4.440	4.440	1.920
13	10.400	16.500	22.200	19.800	5.910	13.800	11.800	14.900	4.750	4.140	3.850	2.260
14	10.700	15.800	21.600	18.800	5.910	21.000	10.700	14.200	4.900	3.710	3.710	2.750
15	10.700	14.200	20.100	18.200	6.460	28.400	9.860	12.800	4.750	4.140	3.850	2.750
16	16.500	12.600	19.600	17.200	6.860	30.500	9.140	11.800	4.750	10.700	3.850	2.750
17	31.500	10.900	19.600	16.300	7.080	30.500	9.140	10.400	4.600	13.500	3.710	2.630
18	42.900	9.440	19.600	15.400	6.650	29.100	9.140	9.620	3.710	13.100	3.560	2.380
19	42.900	8.340	18.700	14.900	6.280	27.800	8.900	8.430	3.420	12.800	3.290	2.260
20	38.200	7.680	17.900	14.200	6.090	27.100	8.190	6.860	4.140	12.800	2.880	2.380
21	33.500	8.120	17.400	13.500	5.910	26.500	7.080	6.090	5.060	13.100	2.750	2.630
22	27.500	8.780	16.100	13.100	5.390	24.600	6.090	6.090	6.460	11.500	2.880	2.510
23	22.800	9.000	14.800	12.800	5.230	25.200	5.910	6.090	7.720	9.860	2.880	2.030
24	21.100	9.440	13.500	12.800	4.900	29.100	6.280	6.460	7.720	8.430	2.630	1.810
25	22.200	9.220	12.600	12.100	4.600	33.300	7.080	6.650	7.080	7.960	2.260	1.700
26	22.800	8.340	12.900	11.200	4.600	29.800	7.510	6.280	6.860	7.720	2.260	1.590
27	20.500	8.560	15.100	10.700	4.440	23.900	7.720	5.390	6.460	7.720	2.380	1.700
28	17.400	9.440	16.100	9.860	4.600	19.800	8.660	5.230	5.910	7.080	2.380	1.810
29	14.800	11.200	16.500	8.900		19.800	11.800	5.230	5.560	6.090	2.510	2.030
30	12.900	41.200	16.100	8.900		20.400	15.800	5.720	5.060	5.390	2.630	2.140
31	12.600		15.100	9.140		18.200		6.280		5.560	2.880	

RED RIVER AT INDEX, ARKANSAS

This station is located at the point where the Red River ceases to form the Arkansas-Texas boundary and flows through Arkansas. Samples are collected from U.S. Highway 71 Bridge.

Blue River, Boggy Creek and the Kiamichi River are confluent to the Red River from Oklahoma in the reach above Index and below Denison. Bois D'Arc Creek and Pecan Bayou are the principal tributaries entering from Texas. These tributaries drain an area whose rainfall averages about 40 inches per year.

Nearly all the municipalities in the Red River basin discharge wastes into the river or its tributaries. The two cities nearest to the Index station are DeKalb, Texas and New Boston, Texas at 36 and 25 miles above the station. Both of these communities operate secondary sewage treatment plants and serve a total population of 4,815.

Rotifer populations at this station increased from essentially none in July to 3,000 per liter in the September 2, 1963 sample. Concurrently, total algae counts increased to a maximum of 18,000 in the September 25 sample.

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Station Location: Red River at Index, Arkansas

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Red River below Denison

Station at: 33°33' Latitude 94°02' Longitude

Miles above mouth: 485

Activation Date: February 24, 1957

Sampled by: Arkansas State Water Pollution Control Commission

Field Analysis by: Arkansas State Water Pollution Control Commission
U.S. Public Health Service

Other Cooperating Agencies: Arkansas State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: At Index, Arkansas

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 48,030 square miles with 5,936 square miles probably noncontributing

Period of record: 1936 to present

Average discharge in record period: 12,680 cfs.

Maximum discharge in record period: 297,000 cfs.

Minimum discharge in record period: 378 cfs.

Remarks: Flows affected by operations of Denison Dam.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-3-63	0.06
7-17-63	0.06
7-31-63	0.06
8-14-63	0.07
8-28-63	0.14

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.30	.40
	Na	132	120
	K	6.8	6.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*6	13
	Cd	*3	*7
	As	*28	*67
	B	85	50
	P	*7	*34
	Fe	95	17
	Mo	*3	*34
	Mn	*1.4	*6.7
	Al	–	*34
	Be	*.07	*.17
	Cu	5	7
	Ag	*.6	*1.7
	Ni	*3	*7
	Co	*6	*7
	Pb	*7	*17
	Cr	*2	*17
	V	*13	*34
	Ba	52	87
	Sr	686	268

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	3.3	.4	April to June	5.3	.7
January to March	–	–	July to September	4.9	.7

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT

INDEX, ARKANSAS

43

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER														RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	3	62	10	29	-	-	-	-	-	-	76	43	76	42	152	60						
10	10	62	11	21	1	2	2	4	3	4	30	22	36	29	66	36						
11	20	62	12	28*	1	1	1	2	2	2	43	15	46	18	89	23						
12	19	62	1	24*	4	4	0	3	4	5	35	21	37	19	72	28						
1	23	63	2	25*	2	2	5	3	7	4	26	17	32	19	58	26						
2	28	63	3	18*	0	1	0	0	0	1	9	6	30	9	39	11						
3	13	63	4	22	12	8	1	2	13	8	304	25	101	9	405	27						
5	23	63	6	25*	2	3	1	3	3	4	87	12	61	12	148	17						
6	19	63	7	30*	0	0	0	2	0	2	0	8	11	31	11	32						
7	29	63	9	6*	1	1	1	5	2	5	11	7	34	32	45	33						
8	28	63	10	8*	0	0	2	5	2	5	2	6	43	38	45	38						
9	23	63	11	6*	0	1	1	5	1	5	4	6	35	32	39	33						

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT

INDEX, ARKANSAS 043

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS													CRUSTACEA									NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD					
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL				
10	3	62	38	28	69	17	89	8	26	6	41	-	-	-											-								-	-	-
10	10	62	38	32	55	14	26	12	92	8	34	-	-	3											0								0	0	
11	8	62	26	14	81	10	55	7	48	5	64	-	-	-											-								-	-	-
11	19	62	56	62	26	10	57	7	54	3	18	50	-	0											0								0	0	
12	6	62										30	-	-											-								-	-	-
12	17	62	38	92	73	2	57	1	82	1	4	-	-	-											-								-	-	-
1	17	63	38	15	92	9	97	6	15	5	65	-	-	0											0								0	0	
1	30	63	36	14	80	11	97	10	51	6	59	-	-	1											2								1	1	
2	13	63	80	51	92	23	38	3	12	3	20	-	-	0											0								0	0	
2	28	63	82	32	26	28	92	14	57	9	17	-	-	1											0								0	0	
3	13	63										-	-	-											-								-	-	-
4	9	63	71	16	26	15	92	11	38	7	51	-	-	1											3								0	0	
4	29	63	82	35	80	24	26	11	92	5	25	-	-	0											0								0	0	
5	8	63	38	41	65	10	80	7	26	6	36	-	-	2											2								0	0	
5	23	63	27	36	80	23	26	9	67	5	27	-	-	0											1								0	0	
6	5	63	26	28	38	24	67	12	23	10	26	-	-	8	11	1									0								0	0	
6	19	63	26	35	38	17	67	13	82	12	23	-	-	182	2	4	17	3	15	3	22	3	7	2	3	50	1						0	0	
7	3	63	67	20	38	16	26	16	70	14	34	-	-	2											0								0	0	
7	17	63	18	81	26	4					15	-	-	1											0								0	0	
8	14	63	26	34	18	33	70	7	82	5	21	-	-	547	22	6	9	5	7	5	11	5	17	4	0								0	0	
8	28	63	71	18	84	15	67	12	70	12	43	-	-	1350	22	7	11	7	7	6	2	3	17	1	0								0	1	
9	2	63	18	35	91	17	26	11	82	10	27	-	-	3060	11	9	2	7	7	6	22	6	17	4	0								0	0	
9	25	63	26	26	38	22	91	16	18	8	28	-	-	510	11	7	2	6	17	5	7	4	22	3	0								0	1	

PLANKTON POPULATION

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT INDEX, ARKANSAS

43

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	3700	140	20	410	0	90	0	380	2630	70	830	25	1	26	1																
10	10	62	6100	540	720	540	0	90	20	1640	2590	140	360	69	4	83	3	3	2	77	2	50	2	68	2	92	1	88	1	50	1	25	1
11	8	62	700	60	0	40	0	40	0	80	460	0	0																				
11	19	62	2000	90	0	270	0	380	20	800	400	50	50	68	3	51	1	35	1	69	1												
12	6	62	100	0	0	0	0	0	0	0	110	0	80																				
12	17	62	1400	0	0	260	0	200	0	180	730	40	440	83	3	51	1																
1	17	63	1100	0	20	40	0	0	0	300	690	40	80	71	1																		
1	30	63	200	0	0	20	0	0	0	130	40	0	130																				
2	13	63	2200	20	0	440	0	590	570	290	240	20	20	51	2	65	2	71	1	35	1												
2	28	63	30600	2900	380	1640	0	4870	*	6590	2770	3950	210	65	7	51	5	71	5	68	5	3	4	92	4	88	3	26	3	35	2	17	2
3	13	63	1000	0	0	20	0	90	90	150	660	90	420																				
4	9	63	2200	0	0	260	0	370	0	660	920	110	750	88	3	92	2	68	2	83	1	52	1	87	1	91	1	71	1				
4	29	63	9200	180	310	2460	0	220	0	3740	2330	3480	1830	71	5	68	3	38	3	35	3	92	3	87	2	88	2	26	2	17	1	24	1
5	8	63	400	0	0	20	0	40	0	150	220	70	310																				
5	23	63	7700	0	360	4640	0	80	60	1220	1300	1130	530	35	4	26	3	68	3	38	3	24	2	71	2	17	2	44	2	88	2	83	1
6	5	63	4500	130	70	2900	0	310	0	400	680	350	680	26	3	35	3	82	2	40	2	68	2	88	1	51	1	25	1	38	1	44	1
6	19	63	4500	50	90	2130	0	360	20	540	1310	270	90	35	3	88	3	83	2	31	2	68	2	38	1	71	1	51	1	57	1		
7	3	63	2500	0	40	1620	0	0	0	350	500	170	170	38	2	35	2	88	2	68	1	83	1										
7	17	63	8700	110	130	3960	0	240	40	1760	2440	1650	880	67	4	35	4	38	3	26	2	69	1	24	1	44	1	30	1	25	1		
8	14	63	6200	160	1330	970	0	200	20	1060	2490	290	450	88	4	11	3	92	3	68	2	67	2	12	2	83	2	38	1	35	1		
8	28	63	11400	220	1010	2300	0	0	0	1980	5930	320	1330	88	5	68	3	71	3	92	3	17	2	25	2	33	2	38	2	11	1	30	1
9	2	63	11700	20	730	2240	0	110	40	1010	7520	400	2350	92	5	83	4	87	3	35	3	88	3	25	3	67	3	68	1	25	1	71	1
9	25	63	18500	1550	2950	4690	0	110	0	1260	7900	700	2500	83	5	92	5	18	4	17	3	3	3	38	3	87	3	88	3	68	3	17	3
2	28	63						*	11420																								

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE ARKANSAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT INDEX, ARKANSAS

43

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	-	-	7.7	-	-	-	-	-	270	108	324	20	350	190	-	391	-
11	20	62	-	-	7.7	-	-	-	-	-	212	130	300	0	*25	158	.0	765	-
12	6	62	-	-	7.6	-	-	-	-	-	200	128	304	5	*25	158	.0	760	-
12	19	62	-	-	8.0	-	-	-	-	-	268	110	300	0	*25	187	.0	852	-
1	17	63	-	-	7.8	-	-	-	-	-	190	120	270	-	*25	155	.0	710	-
1	23	63	-	-	7.9	-	-	-	-	-	220	120	300	-	*25	170	.0	800	-
2	13	63	-	-	7.6	-	-	-	-	-	234	160	336	5	*25	180	.0	820	-
2	28	63	-	-	7.9	-	-	-	-	-	138	248	336	5	*25	112	.0	670	-
3	13	63	-	-	7.1	-	-	-	-	-	104	96	172	15	450	78	.0	400	-
5	8	63	-	-	-	-	-	-	-	-	60	96	148	25	240	52	.0	320	-
5	23	63	-	-	-	-	-	-	-	-	240	128	310	5	*25	188	.0	850	-
6	5	63	-	-	-	-	-	-	-	-	220	146	330	0	*25	176	.0	800	-
6	19	63	-	-	-	-	-	-	-	-	290	122	340	5	*25	230	.0	940	-
7	3	63	-	-	-	-	-	-	-	-	290	122	174	5	*25	250	.0	1010	-
7	17	63	-	-	-	-	-	-	-	-	230	104	270	5	*25	175	.0	760	-
7	31	63	-	-	-	-	-	-	-	-	250	104	290	5	*25	188	.1	830	-
8	14	63	-	-	-	-	-	-	-	-	290	120	360	5	*25	205	.0	980	-
8	28	63	-	-	-	-	-	-	-	-	320	122	400	5	*25	260	.0	1030	-
9	11	63	-	-	-	-	-	-	-	-	250	150	350	0	*25	184	.0	850	-
9	25	63	-	-	-	-	-	-	-	-	280	188	360	5	*25	184	.0	870	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Index, Arkansas
Operated by U.S. Geological Survey

STATE: Arkansas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Red River below Denison

STATION LOCATION: Red River at Index, Arkansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	5.600	19.100	37.400	6.660	6.010	2.380	4.350	37.400	3.530	3.530	3.560	2.290
2	8.470	16.300	29.400	6.440	5.800	3.390	3.600	33.900	4.050	3.900	4.880	3.210
3	14.600	14.600	27.000	5.010	5.600	3.900	3.390	27.000	3.320	3.750	5.660	3.280
4	14.600	12.700	25.800	4.200	4.830	3.900	3.060	21.200	3.120	3.900	5.860	3.070
5	12.700	9.980	26.400	5.400	4.500	3.460	3.120	19.100	2.680	4.050	5.060	2.700
6	9.000	7.140	27.000	7.400	4.350	3.390	4.500	16.700	2.300	3.320	4.340	2.120
7	7.400	6.220	22.300	12.700	4.050	3.900	6.440	13.800	2.120	3.390	4.180	1.580
8	6.900	7.400	18.100	15.400	3.460	4.200	6.660	9.600	2.120	4.050	3.860	1.340
9	7.140	7.400	15.400	13.400	2.800	3.900	6.220	7.140	2.820	3.900	2.640	1.720
10	7.140	7.140	13.800	9.600	2.570	4.350	5.800	6.220	3.600	2.800	2.020	2.400
11	6.900	6.900	13.000	7.980	3.060	5.010	5.200	6.010	3.900	2.800	2.290	2.580
12	6.220	5.800	11.300	7.140	3.530	7.660	4.500	5.400	4.050	2.800	2.940	2.640
13	10.400	4.830	9.600	6.900	3.530	12.300	4.200	4.830	3.900	2.470	3.000	2.400
14	21.200	4.500	9.980	6.440	3.260	11.600	5.200	4.500	3.000	3.430	2.880	1.860
15	27.600	3.900	10.200	6.010	2.570	9.980	6.010	4.660	2.230	5.600	2.640	1.500
16	36.600	3.320	9.600	5.800	2.230	9.600	6.220	4.660	2.960	6.010	2.290	1.910
17	35.200	3.390	9.000	5.600	2.170	8.440	5.400	3.530	4.200	8.680	1.810	2.460
18	25.800	4.350	8.720	4.660	2.030	7.140	4.050	3.120	4.830	10.600	1.860	2.240
19	19.100	5.200	8.180	5.010	1.910	6.440	3.320	3.750	5.200	8.060	2.340	1.620
20	13.800	5.800	6.900	5.600	1.850	6.010	3.000	4.200	5.200	5.080	2.020	1.300
21	10.600	6.010	5.800	6.010	1.800	5.800	3.600	4.660	4.500	4.180	1.460	1.160
22	8.180	5.010	6.010	6.220	1.780	10.500	4.660	5.010	4.350	4.340	1.380	1.100
23	7.400	3.530	6.660	6.010	1.780	17.200	5.200	4.660	4.200	4.260	1.760	1.370
24	7.660	3.900	8.720	6.440	1.820	15.000	4.830	3.530	3.750	4.100	1.860	1.720
25	7.660	5.200	10.200	6.010	1.950	9.600	3.750	2.800	3.320	4.100	1.860	1.720
26	5.800	5.600	10.900	5.200	2.030	7.980	2.860	3.060	3.600	3.560	2.180	1.760
27	5.010	6.220	10.600	5.200	1.990	13.400	3.390	3.390	3.750	3.140	2.240	1.760
28	5.400	27.600	9.600	6.440	1.990	14.200	7.860	3.530	3.000	4.430	2.290	1.670
29	8.200	53.000	8.180	7.400		10.200	25.800	3.390	2.380	5.660	2.340	1.300
30	11.600	50.400	6.660	7.660		7.400	36.600	3.600	2.570	5.060	2.400	1.240
31	18.100		6.440	6.900		5.600		3.530		3.860	2.070	

736-499 O - 64 - 10

RED RIVER AT DENISON, TEXAS

Samples are collected from the penstock of Denison Dam. The Red River at this point has formed a boundary between Texas and Oklahoma for approximately 200 miles. There is no municipal use of the Red River above the station because of the high concentrations of salt from springs and flood plains. Oil field practices in the past have contributed to this salt load but these sources are being eliminated by State enforcement agency actions. Almost all of the communities upstream from Denison use either the Red River or a tributary as a receiving water for their municipal wastes. The nearest discharge, Ardmore, Oklahoma is about 70 miles away and discharges its wastes to a tributary of Lake Texoma.

The Arkansas-Red River Water Quality Conservation Project was conducted by the Public Health Service to define natural salt sources. A final report is scheduled to be available in late 1964.

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Station Location: Red River at Denison, Texas

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Lower Red River below Denison

Station at: 33°49' Latitude 96°34' Longitude

Miles above mouth: 726

Activation Date: August 4, 1958

Sampled by: U.S. Army Corps of Engineers

Field Analysis by: Denison Water Department

Other Cooperating Agencies: Texas State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Ft. Denison Dam, Denison, Texas

Gaging station operated by: U.S. Army Corps of Engineers

Drainage area at gaging station: 39,720 square miles with 5,936 square miles probably noncontributing

Period of record: 1923 to present

Average discharge in record period: 5,201 cfs.

Maximum discharge in record period: 201,000 cfs.

Minimum discharge in record period: 12 cfs.

Remarks: Flows affected by regulation at Denison Dam. Gaging station at various sites within 2 miles prior to October 1961.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-1-63	0.08
7-8-63	0.05
7-15-63	0.06
7-22-63	0.06
7-29-63	0.07
8-5-63	0.07
8-12-63	0.08
8-19-63	0.08
8-26-63	0.06
9-3-63	0.04
9-9-63	0.04
9-23-63	0.12
9-30-63	0.08

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.45	.50
	Na	195	200
	K	12	7.1
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	105	15
	Cd	*10	*10
	As	*50	*50
	B	144	93
	P	*50	*49
	Fe	36	*20
	Mo	*10	49
	Mn	*2	*10
	Al	–	*49
	Be	*.25	*.25
	Cu	22	29
	Ag	*2	*2.5
	Ni	*5	*10
	Co	*20	*10
	Pb	*50	*25
	Cr	*5	*25
	V	*50	*50
	Ba	204	93
	Sr	971	480

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	5.0	.4	April to June	–	–
January to March	–	–	July to September	5.6	.5

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE TEXAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT DENISON, TEXAS

44

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	11	7	-	-	-	-	-	-	20	28	52	37	72	46						
10	8	62	12	14	0	2	2	5	2	6	21	29	22	40	43	49						
10	15	62	12	24	-	-	-	-	-	-	3	4	128	20	131	20						
10	22	62	12	22	-	-	-	-	-	-	4	24	28	31	32	39						
10	29	62	12	20	-	-	-	-	-	-	24	28	45	37	69	46						
11	26	62	12	12*	0	2	1	4	1	4	36	30	41	35	77	46						
12	31	62	1	30*	0	2	2	5	2	5	2	30	29	39	31	49						
1	28	63	2	20*	0	2	3	8	3	8	5	32	51	48	56	58						
2	25	63	3	11*	0	2	12	7	12	7	13	15	45	19	58	24						
3	26	63	4	15*	0	0	0	2	0	2	2	3	48	19	50	19						
4	29	63	5	22*	0	0	0	5	5	5	0	6	43	36	43	36						
5	27	63	6	17*	1	3	0	5	1	6	16	14	47	19	63	24						
6	24	63	7	23*	0	1	0	4	0	4	2	4	27	52	29	52						
7	29	63	8	19*	0	0	3	5	3	5	4	3	32	19	36	19						
8	26	63	9	23*	0	1	1	5	1	5	4	3	33	19	37	19						
9	30	63	10	22*	0	0	0	5	0	5	0	15	23	37	23	40						

PLANKTON POPULATION

STATE TEXAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT DENISON, TEXAS 044

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Identify/take) Number per ml.	ROTIFERS										CRUSTACEA								NEMATODES (Identify/take) Number per liter	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)								
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	38	83	70	5	26	4	92	2	6	-	-	82	22	3	11	3	17	2	4	1			12	50	2	76	2			2	0
10	15	62	38	89	26	6	71	1	70	1	3	-	-	0											0							0	0
11	5	62										-	-	0											1							0	0
11	19	62	38	71	82	14	26	3	92	3	9	-	-	0											2							0	0
12	3	62										50	-	0											1							0	0
12	17	62	38	92	27	3	26	2	70	1	2	40	-	0											0							0	0
1	7	63										-	-	1											3							0	0
1	21	63	38	92	82	1	71	1	92	1	5	-	-	23	21	3									3							0	0
2	4	63	97	48	38	37	80	8	92	2	5	-	-	1											3							0	0
2	18	63	82	65	38	22	80	3	92	3	7	-	-	0											0							0	0
3	4	63										-	-	27	11	2	21	1							1							0	0
3	18	63	36	65	82	16	71	4	92	3	12	-	-	93	11	4	7	2	17	1	14	1			21							0	0
4	2	63	38	73	92	8	64	3	26	2	14	-	-	126	11	4	7	4	15	1	17	1	46	1	102	76	5	50	4	51	2	0	0
4	15	63										-	-	0											0							0	0
5	6	63	38	72	80	22	56	1	23	1	4	-	-	0											2							0	0
5	20	63	38	61	80	16	82	6	32	3	14	-	-	0											0							0	0
6	3	63										-	-	0											0							0	0
6	17	63	38	50	80	4	15	4	46	4	38	-	-	0											0							0	0
7	1	63										-	-	0											-							-	-
7	15	63										-	-	1											0							0	0
8	5	63										-	-	0											0							0	0
8	19	63										-	-	15	11	2									0							0	0
9	3	63	38	66	91	10	26	6	84	4	14	-	-	0											0							0	0
9	16	63	38	72	71	9	26	5	84	4	10	-	-												0							0	0

PLANKTON POPULATION

STATE TEXAS

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT

DENISON, TEXAS 44

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	12600	1530	210	1140	0	1000	0	1080	7620	0	250	83	6	3	4	51	3	68	3	25	2	38	2	71	2	92	1	40	1	17	1
10	15	62	4900	180	20	380	0	20	0	380	3890	70	450	83	5	68	2																
11	5	62	1100	0	0	720	0	180	0	110	90	110	380	35	2	51	1	26	1														
11	19	62	1100	100	0	370	0	0	60	80	460	0	40	83	2	35	2																
12	3	62	100	0	0	50	0	20	0	30	20	0	50																				
12	17	62	2000	0	20	150	0	90	0	70	1720	0	260	83	4																		
1	7	63	600	0	0	130	0	70	0	110	260	0	0																				
1	21	63	2700	0	0	480	0	1120	0	130	1010	150	310	65	3	83	3	35	1	26	1												
2	4	63	800	20	0	110	0	200	0	330	180	70	130																				
2	18	63	2100	20	20	370	0	240	990	350	90	200	220	65	3	71	2	51	1														
3	4	63	400	80	0	210	0	110	0	40	0	0	0																				
3	18	63	500	20	0	0	0	190	0	80	250	40	20	51	1	83	1																
4	2	63	100	0	0	20	0	0	0	0	80	20	80																				
4	15	63	300	0	0	130	0	150	60	0	0	150	0																				
5	6	63	200	0	0	80	0	0	0	100	40	10	0																				
5	20	63	400	0	0	70	0	70	0	90	200	20	220	83	1																		
6	3	63	200	0	0	90	0	20	0	20	80	30	80																				
6	17	63	500	0	0	270	0	50	0	70	140	0	90	35	1																		
7	1	63	200	0	20	60	0	0	0	120	40	350	60																				
7	15	63	00	0	0	0	0	0	0	0	0	0	0																				
8	5	63	300	60	0	140	0	40	0	0	20	0	20																				
8	19	63	400	110	20	20	0	0	0	170	90	170	220																				
9	3	63	1100	40	70	280	0	90	0	90	500	130	370	83	2																		
9	16	63	6700	50	0	230	0	20	0	90	6260	3020	4070	83	6	88	2	92	1														

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE TEXAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT DENISON, TEXAS

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	8	5000	188	58	130	-	-	-	-	-	-	-	-	-	-	-
11	5	62	11	13	5780	214	46	168	-	-	-	-	-	-	-	-	-	-	-
12	4	62	12	12	5630	186	67	119	-	-	-	-	-	-	-	-	-	-	-
12	4	62		*	16410	197	57	140	2	14	17	1	1	15	0	7	5	2	10
1	7	63	1	14	5070	202	31	171	-	-	-	-	-	-	-	-	-	-	-
2	4	63	2	11	5000	223	58	165	2	16	18	2	1	15	0	6	5	2	9
3	13	63	3	20	5090	150	50	100	-	-	-	-	-	-	-	-	-	-	-
4	2	63	4	10	5350	170	58	112	2	18	19	2	1	16	0	6	6	1	6
5	6	63	5	13	5020	214	48	166	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	10	5100	217	74	143	4	21	16	1	1	13	1	7	10	1	15
7	1	63	7	8	5020	250	129	121	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	12	5030	186	58	128	1	18	17	0	1	14	2	6	5	1	10
9	3	63	9	10	5050	262	117	145	-	-	-	-	-	-	-	-	-	-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE TEXAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT DENISON, TEXAS

44

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	24.4	-	8.0	-	-	-	-	-	-	110	380	-	5	-	-	-	-
10	9	62	23.3	-	7.8	-	-	-	-	-	-	108	320	-	5	-	-	-	3
10	16	62	23.3	-	7.6	-	-	-	-	-	-	108	390	-	5	-	-	-	200
10	23	62	22.2	-	7.8	-	-	-	-	-	-	112	380	-	5	-	-	-	72
10	30	62	21.1	-	7.8	-	-	-	-	-	-	112	390	-	5	-	-	-	50
11	6	62	18.8	-	7.7	-	-	-	-	-	-	110	360	-	5	-	-	-	5
11	20	62	15.5	-	7.6	-	-	-	-	-	-	110	360	-	5	-	-	-	20
11	27	62	14.4	-	7.6	-	-	-	-	-	-	108	360	-	5	-	-	-	-
12	4	62	14.4	-	7.6	-	-	-	-	-	-	106	360	-	5	-	-	-	20
12	11	62	13.3	-	7.6	-	-	-	-	-	-	108	360	-	5	-	-	-	10
12	18	62	11.1	-	7.8	-	-	-	-	-	-	112	360	-	5	-	-	-	220
1	8	63	9.4	-	7.8	-	-	-	-	-	-	108	350	-	5	-	-	-	5
1	15	63	7.7	-	7.8	-	-	-	-	-	-	110	350	-	5	-	-	-	10
1	22	63	5.5	-	7.8	-	-	-	-	-	-	114	350	-	5	-	-	-	5
2	5	63	4.4	-	8.0	-	-	-	-	-	-	106	320	-	5	-	-	-	5
2	12	63	4.4	-	7.8	-	-	-	-	-	-	110	350	-	5	-	-	-	*3
2	20	63	5.5	-	7.8	-	-	-	-	-	-	112	330	-	5	-	-	-	*3
2	26	63	5.5	-	7.8	-	-	-	-	-	-	98	320	-	5	-	-	-	5
3	5	63	6.6	-	7.8	-	-	-	-	-	-	98	390	-	5	-	-	-	20
3	12	63	6.6	-	7.8	-	-	-	-	-	-	102	310	-	5	-	-	-	5
3	19	63	7.7	-	7.8	-	-	-	-	-	-	98	410	-	3	-	-	-	47
3	26	63	10.0	-	7.8	-	-	-	-	-	-	104	350	-	5	-	-	-	37
4	1	63	11.1	-	7.8	-	-	-	-	-	-	102	410	-	3	-	-	-	-
4	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*3
4	9	63	12.8	-	7.8	-	-	-	-	-	-	102	360	-	3	-	-	-	10
4	16	63	14.4	-	7.8	-	-	-	-	-	-	108	330	-	3	-	-	-	-
4	23	63	15.5	-	7.6	-	-	-	-	-	-	106	340	-	3	-	-	-	*33
4	30	63	16.6	-	7.5	-	-	-	-	-	-	104	360	-	3	-	-	-	10
5	7	63	17.7	-	7.6	-	-	-	-	-	-	112	400	-	3	-	-	-	*33
5	14	63	18.8	-	7.6	-	-	-	-	-	-	108	380	-	3	-	-	-	-
5	21	63	18.8	-	7.5	-	-	-	-	-	-	110	340	-	3	-	-	-	*3
5	28	63	27.2	-	7.6	-	-	-	-	-	-	108	390	-	3	-	-	-	-
6	4	63	21.1	-	7.4	-	-	-	-	-	-	114	370	-	3	-	-	-	-
6	12	63	21.1	-	7.6	-	-	-	-	-	-	112	400	-	3	-	-	-	10
6	18	63	22.2	-	7.4	-	-	-	-	-	-	112	410	-	3	-	-	-	-
6	24	63	22.2	-	7.4	-	-	-	-	-	-	114	390	-	3	-	-	-	-
6	25	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50
7	2	63	23.3	-	7.4	-	-	-	-	-	-	118	360	-	3	-	-	-	*3
7	9	63	24.4	-	7.4	-	-	-	-	-	-	122	370	-	3	-	-	-	5

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE TEXAS

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN LOWER RED RIVER BELOW DENISON

STATION LOCATION RED RIVER AT DENISON, TEXAS

44

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	17	63	24.0	-	7.4	-	-	-	-	-	-	120	380	-	3	-	-	-	5
7	23	63	24.4	-	7.4	-	-	-	-	-	-	122	385	-	3	-	-	-	5
7	30	63	24.4	-	7.4	-	-	-	-	-	-	120	390	-	3	-	-	-	5
8	6	63	26.6	-	7.4	-	-	-	-	-	-	122	394	-	3	-	-	-	5
8	13	63	25.0	-	7.4	-	-	-	-	-	-	124	392	-	3	-	-	-	*33
9	3	63	-	-	-	-	-	-	-	-	-	112	410	-	3	-	-	-	-
9	9	63	24.4	-	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	5
9	17	63	26.6	-	7.2	-	-	-	-	-	-	110	400	-	3	-	-	-	30
9	24	63	24.4	-	7.2	-	-	-	-	-	-	118	360	-	3	-	-	-	*3
												114	380	-	3	-	-	-	7

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Denison, Texas
Operated by U.S. Army Corps of Engineers

STATE: Texas

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Lower Red River below Denison

STATION LOCATION: Red River at Denison, Texas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.135	3.990	10.300	.500	3.400	1.200	1.480	2.250	1.500	4.400	4.520	2.290
2	2.770	3.690	5.960	3.300	3.500	1.000	3.580	3.280	.100	5.940	3.580	.200
3	2.860	1.770	4.740	3.100	3.320	.336	3.520	3.640	.200	5.980	4.660	1.840
4	2.660	.432	4.880	2.410	.226	.131	3.100	2.640	7.140	6.330	2.300	4.960
5	2.760	.666	4.880	2.770	.387	1.850	3.450	.111	11.800	7.620	.208	2.520
6	3.510	2.930	5.150	.348	.700	1.570	4.220	.070	12.200	6.080	5.510	2.480
7	3.340	2.990	5.320	.706	.694	1.370	.341	2.560	12.200	3.760	5.860	2.730
8	2.530	2.380	4.530	2.420	.548	1.490	.300	2.680	12.200	1.180	5.930	3.040
9	3.190	1.910	3.040	4.000	.788	1.720	2.700	2.500	15.000	4.790	5.780	.266
10	5.360	2.060	3.150	4.800	.719	.160	2.240	1.940	25.800	4.780	5.660	3.420
11	8.960	2.640	4.630	4.200	.566	.087	3.030	1.970	37.500	4.730	2.990	4.720
12	10.000	2.290	4.800	3.000	4.050	2.270	2.200	.113	43.200	4.880	1.830	5.140
13	9.870	3.770	4.800	.519	3.920	2.380	3.140	.071	43.200	4.900	5.090	5.470
14	9.960	4.130	4.700	1.150	3.550	2.950	3.320	.124	43.200	3.820	5.360	5.620
15	9.450	4.240	4.600	2.140	2.070	1.870	1.100	1.360	40.800	.255	5.220	3.660
16	9.200	4.220	3.000	4.450	1.360	1.260	3.140	1.500	32.200	3.250	5.110	2.530
17	9.060	4.190	3.000	4.310	.419	.147	2.460	1.530	30.200	5.220	5.430	4.720
18	9.790	.340	4.500	3.740	.362	.107	2.370	1.560	26.500	4.810	3.160	4.690
19	8.680	.378	4.600	3.820	2.150	1.520	2.400	.200	20.600	5.060	1.660	5.020
20	5.500	3.260	4.500	4.760	2.840	1.430	2.060	.156	20.600	5.260	5.260	5.130
21	2.870	3.360	4.500	4.250	2.960	1.750	.838	1.150	20.300	2.820	5.330	4.790
22	.203	6.450	4.600	3.000	2.980	1.790	.534	.260	20.300	2.620	5.270	1.900
23	3.560	9.590	3.000	3.300	3.060	.960	.204	1.280	20.300	5.010	5.340	.425
24	4.130	9.590	2.000	2.600	.178	.095	1.620	.386	19.700	5.300	5.480	4.660
25	3.990	9.370	.600	3.180	.115	.611	.516	.232	13.900	5.280	1.650	4.320
26	3.980	9.150	4.600	3.340	2.630	1.480	.549	.837	10.200	4.220	.165	4.670
27	3.700	8.270	4.700	3.400	1.540	1.190	.436	.241	6.640	2.970	4.920	5.610
28	1.080	8.710	4.900	3.400	2.400	1.890	2.090	.281	5.320	3.760	5.130	6.500
29	.339	9.150	5.000	3.430		1.520	.420	.103	5.050	2.740	4.920	6.300
30	3.190	10.300	3.200	3.410		1.740	2.600	.600	7.280	5.460	5.320	3.550
31	2.620		.400	3.360		.800		2.410		6.990	5.440	

VERDIGRIS RIVER AT NOWATA, OKLAHOMA

The Verdigris River begins in southeast Kansas and flows southward to its junction with the Arkansas River near Muskogee, Oklahoma. This station is located twenty miles downstream from the Kansas-Oklahoma State line. Samples are taken from the municipal water plant intake.

Three Kansas communities with a total population of 30,500 discharge a BOD population equivalent of 12,200 into this stream within 100 river miles.

Oolagah Reservoir is being constructed about 20 miles downstream so that the sampling point will eventually be in pool.

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Station Location: Verdigris River at Nowata, Oklahoma

Major Basin: Southwest-Lower Mississippi River

Minor Basin: Verdigris River

Station at: 36°42' Latitude 95°43' Longitude

Miles above mouth: 120

Activation Date: March 19, 1962

Sampled by: Nowata Water Department

Field Analysis by: Nowata Water Department
U.S. Public Health Service

Other Cooperating Agencies: Oklahoma State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Lenapah, Oklahoma

Gaging station operated by: U.S. Army Corps of Engineers

Drainage area at gaging station: 3,639 square miles

Period of record: 1938 to present

Average discharge in record period: 2,254 cfs.

Maximum discharge in record period: 137,000 cfs.

Minimum discharge in record period: 0 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.31	.35
	Na	36	56
	K	3.5	4.1
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*7	*4
	Cd	*4	*4
	As	*35	*42
	B	39	9
	P	*9	*21
	Fe	32	21
	Mo	*4	*21
	Mn	*1.8	4.3
	Al	–	17
	Be	*.09	*.11
	Cu	4	*4
	Ag	* .7	1.1
	Ni	*4	*4
	Co	*7	*4
	Pb	9	*11
	Cr	2	*11
	V	*4	*21
	Ba	19	70
	Sr	630	247

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.5	.3	April to June	4.2	.5
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN VERDIGRIS RIVER

STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA 109

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION		ALPHA					BETA					DATE OF DETERMINATION		GROSS ACTIVITY		
					SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l ±	MO.	DAY	pc/g	±	pc/g	±
10	2	62	11	15	0	3	0	1	0 ± 3	63	70	18	7	81 70						
10	8	62	11	14	1	2	0	1	1 ± 2	25	14	17	8	42 16						
10	15	62	12	17	1	1	0	2	1 ± 2	24	9	36	11	60 14						
10	22	62	11	21	1	1	1	2	2 ± 2	3	11	33	15	36 19						
10	29	62	11	26	0	1	1	1	1 ± 1	9	5	23	8	32 9						
11	5	62	12	27	0	1	1	2	1 ± 2	2	12	25	16	27 20						
11	12	62	12	28	1	1	4	4	5 ± 4	4	12	36	17	40 21						
11	19	62	12	6	0	1	2	3	2 ± 3	10	11	65	16	75 19						
11	26	62	12	18	0	1	1	2	1 ± 2	22	12	63	18	85 22						
12	3	62	1	7	0	1	1	2	1 ± 2	40	5	63	6	103 8						
12	10	62	1	8	0	1	0	0	0 ± 1	6	6	41	11	47 13						
12	17	62	1	10	1	1	0	1	1 ± 1	1	12	34	18	35 22						
12	24	62	1	14	1	1	1	2	2 ± 2	34	6	57	8	91 10						
12	31	62	1	14	0	1	2	3	2 ± 3	12	6	37	9	49 11						
1	7	63	1	24	35	17	1	1	36 ± 17	238	90	39	15	277 102						
1	14	63	1	24	2	2	1	2	3 ± 3	32	15	43	17	75 23						
1	21	63	2	1	0	1	0	3	0 ± 3	5	10	34	15	39 15						
1	28	63	2	11	0	1	0	1	0 ± 1	4	6	37	9	41 11						
2	4	63	2	18	0	1	2	3	2 ± 3	5	6	37	9	42 11						
2	11	63	2	26	1	1	1	2	2 ± 2	7	15	28	18	35 23						
2	25	63	3	11	1	1	0	1	1 ± 1	15	10	71	17	86 20						
3	4	63	3	20	0	2	2	3	2 ± 3	6	23	60	29	66 37						
3	11	63	3	25	44	24	1	2	45 ± 24	393	57	46	9	439 58						
3	18	63	4	1	2	2	2	2	4 ± 2	86	8	47	8	133 11						
3	25	63	4	10	2	2	7	4	9 ± 4	9	12	59	17	68 21						
4	29	63	5	31*	1	1	5	3	6 ± 3	18	7	39	10	57 12						
5	27	63	6	25*	0	2	0	2	0 ± 3	6	23	51	26	57 35						
6	24	63	8	6*	2	2	0	1	2 ± 2	56	15	47	16	103 22						
7	29	63	8	29*	0	1	1	2	1 ± 2	21	7	34	16	55 17						
8	26	63	10	4*	0	0	1	2	1 ± 2	9	5	51	16	60 17						

PLANKTON POPULATION

STATE OKLAHOMA
MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN VERDIGRIS RIVER
STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																															
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS																CRUSTACEA																	
															GENERA AND COUNT LEVEL (See text for Codes)															GENERA AND COUNT LEVEL (See text for Codes)															
															1ST		2ND		3RD		4TH		5TH						1ST		2ND		3RD											
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NUMBER PER LITER	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
10	2	62	92	12	36	11	71	7	26	6	64			-											-																			
10	15	62	28	27	82	15	80	14	92	6	38			2											0																			
11	5	62	97	52	26	38	57	3	80	2	5			4											1																			
11	19	62	26	29	57	28	82	22	80	10	11			7											0																			
12	3	62	92	69	62	14	26	3	71	2	12			2											1																			
12	17	62	27	22	82	15	57	12	58	11	40			3											0																			
1	7	63												-											-																			
1	21	63												23	17	2	11	1							0																			
2	4	63												2											0																			
2	18	63	86	66	93	3	71	3	51	3	25			0											1																			
3	4	63	91	40	86	32	93	10	46	5	13			15	11	2	17	2							1																			
3	18	63	92	24	86	10	71	7	36	7	52			21	11	3									6	50	2																
4	1	63	80	38	86	18	58	9	26	5	30			102	11	4	21	3							6	77	2																
4	15	63	82	49	58	12	89	10	26	8	21			3000	11	9	21	6	2	5	17	5	15	3	3	50	1															
5	6	63	82	44	26	38	80	6	92	2	10			-											-																			
5	20	63	26	67	82	26	80	2	64	1	4			-											-																			
6	3	63	26	86	75	4	56	3	80	2	5			-											-																			
6	17	63	26	70	82	13	56	5	47	2	10			-											-																			
8	5	63												-											-																			
8	19	63												-											-																			
9	3	63												-											-																			
9	16	63												-											-																			
9	30	63												-											-																			

PLANKTON POPULATION

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST—LOWER MISSISSIPPI RIVER

MINOR BASIN VERDIGRIS RIVER

STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	100	0	0	0	0	20	0	10	20	60	210																			
10	15	62	900	0	0	40	0	120	80	330	330	80	40	68	1																	
11	5	62	52400	120	0	660	0	290	210	50300	790	1700	80	69	8	68	8	71	4	92	2	51	1	88	1	40	1	60	1	91	1	25	1
11	19	62	11100	270	0	410	0	4680	480	5110	170	1040	0	57	5	71	4	68	4	69	2	60	2	51	2	3	1	35	1				
12	3	62	2100	0	0	120	0	40	0	660	1280	120	170	92	3	68	2	69	1														
12	17	62	1300	20	0	180	0	790	0	240	110	0	70	59	3	51	1	26	1														
1	7	63	1300	0	0	20	0	0	0	90	1140	70	880																				
1	21	63	100	0	0	0	0	30	0	0	30	0	0																				
2	4	63	400	0	0	20	0	330	0	40	20	0	20	59	1																		
2	18	63	3500	40	110	40	0	1280	1640	20	400	40	20	65	4	51	3	91	1														
3	4	63	19200	90	50	450	0	3150	*	90	2030	230	720	64	7	52	4	92	3	51	3	91	3	26	2	65	1						
3	18	63	700	0	0	0	0	90	40	70	510	0	220																				
4	1	63	12400	40	0	90	0	880	1210	9900	240	1190	530	69	5	68	3	65	3	71	3	51	2	52	2	60	2						
4	15	63	5700	20	40	650	0	270	1320	2560	800	2860	270	71	4	63	4	92	3	68	1	69	1	51	1								
5	6	63	8500	20	0	750	0	1120	70	6270	310	790	370	69	4	71	4	68	4	65	2	51	2	26	1	38	1						
5	20	63	1400	0	0	130	0	90	180	970	40	420	180	68	3	71	1																
6	3	63	2300	0	0	400	0	60	60	1530	270	500	170	68	4	24	2																
6	17	63	900	0	0	90	0	180	40	510	110	290	40	68	2																		
8	5	63	2800	80	0	500	0	1040	80	990	120	270	20	52	3	34	1																
8	19	63	4000	60	20	290	0	850	130	2340	270	1220	20	51	3																		
9	3	63	3700	160	0	380	0	870	70	2140	90	800	270	51	3	69	1																
9	16	63	5900	0	0	570	0	3870	50	1330	110	540	70	51	5	57	1	52	1	69	1	38	1										
9	30	63	4100	360	0	500	0	1530	20	1220	520	830	140	51	4	3	2	38	1														
3	4	63							* 13370																								

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN VERDIGRIS RIVER

STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA

DATE OF SAMPLE BEGINNING			DATE OF SAMPLE END		GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
											NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	8	62	10	20	5250	120	32	88	0	8	14	0	1	12	1	4	1	1	4
11	6	62	11	16	5770	212	70	142	1	19	27	1	1	23	2	8	4	3	8
12	6	62	12	14	5070	183	88	95	3	27	20	1	1	18	0	11	8	3	16
1	22	63	2	14	4860	183	45	138	1	10	22	2	3	16	1	4	2	2	4
3	6	63	3	21	4350#	236	136	100	4	39	35	2	2	28	3	15	14	3	26
4	6	63	4	14	5120	184	77	107	2	19	29	1	2	24	2	11	5	2	9
5	1	63	5	9	5255	212	85	127	2	17	35	2	2	29	2	13	5	3	10
6	1	63	6	9	5120	127	49	78	1	11	19	1	1	15	2	7	3	1	7
7	1	63	7	8	3790	238	137	101	6	37	40	3	4	33	0	22	15	2	15
8	1	63	8	10	4400	188	67	121	-	-	-	-	-	-	-	-	-	-	-
9	1	63	9	9	5000	199	89	110	2	18	35	2	2	29	2	13	9	3	9

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE OKLAHOMA

MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER

MINOR BASIN VERDIGRIS RIVER

STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA 107

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	-	-	7.2	-	-	-	-	-	20	88	108	25	370	20	.0	165	21000
10	8	62	-	-	7.7	-	-	-	-	-	35	116	140	20	*25	23	.0	238	300
10	15	62	-	-	7.7	-	-	-	-	-	50	152	188	10	*25	34	.0	294	900
10	22	62	-	-	8.0	-	-	-	-	-	75	172	216	5	*25	34	.0	352	170
10	29	62	-	-	8.2	-	-	-	-	-	63	180	240	10	*25	38	.1	390	-
11	1	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10
11	5	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	260
11	12	62	-	-	8.3	-	-	-	-	-	91	196	256	10	*25	41	.0	429	50
11	19	62	-	-	7.9	-	-	-	-	-	94	204	282	5	*25	46	.1	430	9500
11	26	62	5.4	2.7	7.6	-	-	-	-	.0	82	200	256	5	*25	43	.0	426	-
11	27	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10000
12	3	62	5.0	2.2	7.0	-	-	-	-	.6	47	170	216	15	*25	40	.0	347	2000
12	10	62	5.5	2.6	7.9	-	-	-	-	.8	82	190	250	5	*25	44	.1	456	760
12	17	62	6.1	5.1	8.1	-	-	-	-	-	95	198	264	0	*25	46	.1	430	50
12	24	62	3.9	2.7	7.9	-	-	-	-	1.4	81	164	208	15	*25	50	.0	400	1000
12	31	62	3.0	3.3	8.0	-	-	-	-	1.2	87	160	272	-	*25	56	.0	470	100
1	7	63	5.0	8.0	8.4	-	-	-	-	-	48	132	180	-	1000	46	.0	335	3400
1	14	63	.0	11.4	7.9	-	-	-	-	.9	91	186	252	-	*25	40	.0	420	1100
1	21	63	.5	9.5	8.0	-	-	-	-	.3	98	202	268	-	400	48	.0	415	-
1	28	63	1.0	9.4	7.9	-	-	-	-	3.2	97	224	272	-	*25	54	.0	510	50
2	4	63	.5	5.7	8.2	-	-	-	-	.4	120	220	310	-	*25	56	.1	515	-
2	11	63	3.7	13.8	7.9	-	-	-	-	.4	96	218	298	10	*25	57	.0	470	50
2	18	63	2.5	16.1	8.0	-	-	-	-	.3	103	240	292	5	*25	56	.1	465	100
2	25	63	4.4	-	8.4	-	-	-	-	.0	132	204	286	5	*25	54	.0	500	190
3	4	63	7.8	-	8.4	-	-	-	-	.1	177	192	280	5	*25	53	.0	574	50
3	11	63	7.0	12.5	7.8	-	-	-	-	.7	75	160	240	10	3100	44	.0	390	150000
3	18	63	10.0	12.0	7.8	-	-	-	-	.0	84	136	212	10	180	46	.1	377	3500
3	25	63	15.0	9.6	7.9	-	-	-	-	.0	87	188	232	10	60	55	.0	430	900
4	1	63	18.3	9.6	8.2	-	-	-	-	.0	113	176	250	10	*25	52	.0	460	2600
4	8	63	17.0	9.7	8.1	-	-	-	-	.0	90	204	248	5	50	53	.0	410	500
4	15	63	6.4	8.1	8.1	-	-	-	-	.0	101	212	256	0	*25	57	.0	420	1300
4	22	63	21.5	8.1	7.9	-	-	-	-	-	90	192	240	5	*25	52	.0	440	700
4	29	63	10.5	7.6	-	-	-	-	-	.2	-	-	-	-	-	-	-	-	900
5	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000
5	20	63	22.2	5.0	8.1	-	-	-	-	.0	123	210	300	5	*25	62	.0	500	-
5	27	63	21.0	7.9	8.1	-	-	-	-	.0	140	196	300	5	*25	53	.0	530	*11
6	3	63	23.2	5.6	7.6	-	-	-	-	.0	60	120	170	5	*25	36	.0	280	2100

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE OKLAHOMA
MAJOR BASIN SOUTHWEST-LOWER MISSISSIPPI RIVER
MINOR BASIN VERDIGRIS RIVER
STATION LOCATION VERDIGRIS RIVER AT NOWATA, OKLAHOMA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	10	63	29.0	10.1	8.4	-	-	-	-	.0	75	114	180	10	*25	21	.0	280	630
6	17	63	25.0	3.2	7.6	-	-	-	-	.1	105	116	240	10	*25	30	.0	350	-
6	24	63	26.5	5.3	7.8	-	-	-	-	.0	55	120	170	15	200	40	.0	300	4300
7	1	63	-	7.1	8.0	-	-	-	-	.0	50	140	220	5	*25	40	.0	370	320
7	8	63	31.0	6.8	8.4	-	-	-	-	.0	110	120	210	5	*25	40	.0	390	100
7	15	63	28.0	6.6	8.2	-	-	-	-	.0	120	126	200	10	*25	45	.0	380	100
7	22	63	31.0	6.6	8.4	-	-	-	-	.0	200	124	270	5	*25	41	.0	510	*11
7	29	63	26.0	4.4	7.6	-	-	-	-	.2	120	88	190	10	142	33	.1	340	1200
8	5	63	31.0	10.1	8.4	-	-	-	-	.0	95	86	180	5	*25	25	.0	270	*11
8	11	63	30.0	4.8	7.2	-	-	-	-	.0	120	100	160	5	*25	63	.0	460	970
8	19	63	27.0	8.1	8.4	-	-	-	-	.2	130	100	160	5	*25	45	.0	460	380
8	26	63	29.0	8.2	8.4	-	-	-	-	.0	106	104	168	5	*25	44	.0	410	*11
9	3	63	27.0	8.0	8.4	-	-	-	-	.0	110	120	188	0	*25	43	.0	380	400
9	9	63	-	8.8	8.4	-	-	-	-	.0	150	110	200	0	*25	43	.0	480	40
9	16	63	-	8.4	8.4	-	-	-	-	.0	166	120	200	0	*25	42	.0	520	400
9	23	63	25.0	6.4	7.8	-	-	-	-	.0	178	124	220	5	*25	47	.0	560	10
9	30	63	21.0	3.0	7.9	-	-	-	-	.0	174	128	220	5	*25	50	.0	550	350

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Lenapah, Oklahoma
Data Supplied by U.S. Army Corps of Engineers

STATE: Oklahoma

MAJOR BASIN: Southwest-Lower Mississippi River

MINOR BASIN: Verdigris River

STATION LOCATION: Verdigris River at Nowata, Oklahoma

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	15.800	.358	1.960	.373	.303	.220	.639	.102	.403	.155	.062	.028
2	12.600	.306	1.700	.403	.293	.240	.616	.122	.251	.114	.062	.024
3	5.780	.358	1.300	.388	.298	.242	.550	.139	.168	.080	.058	.022
4	5.310	.301	.999	.513	.303	1.310	.490	.101	.115	.058	.050	.032
5	4.860	.242	.793	3.380	.344	1.920	.419	.124	.084	.044	.044	.032
6	3.910	.218	.663	7.590	.373	1.190	.373	.161	.067	.036	.043	.030
7	2.730	.197	.616	7.680	.490	1.440	.358	.155	.058	.030	.194	.023
8	1.550	.180	.593	4.230	.639	1.770	.358	.144	.052	.023	.168	.023
9	1.260	.170	.471	3.820	.616	1.730	.331	.168	.050	.020	.075	.026
10	1.190	.159	.373	3.570	.639	5.880	.321	.202	.048	.017	.056	.028
11	1.090	.153	.344	2.980	.616	6.080	.308	.202	.046	.024	.194	.027
12	.766	.155	.324	2.100	.571	4.600	.306	.168	.039	.029	.141	.025
13	.529	.157	.306	1.300	.471	4.690	.296	.137	.032	.038	.102	.022
14	.471	.150	.291	.800	.571	4.860	.264	.114	.028	.040	.193	.021
15	.571	.141	.283	.616	.509	5.040	.248	.087	.026	.044	.220	.020
16	.593	.141	.301	.529	.388	4.600	.246	.072	.079	.056	.106	.018
17	.471	.143	.303	.593	.331	2.860	.246	.063	1.930	.058	.068	.017
18	.403	.159	.306	.593	.316	1.480	.248	.057	1.150	.050	.056	.016
19	.373	.170	.308	.540	.286	1.580	.262	.052	.550	.041	.054	.015
20	.358	.178	1.170	.520	.301	1.660	.264	.050	.713	.034	.053	.014
21	.306	.182	.639	.560	.298	1.400	.240	.047	1.130	.031	.079	.013
22	.281	.199	.571	.580	.267	1.130	.226	.045	1.220	.027	.083	.016
23	.269	.189	.550	.520	.271	.821	.197	.043	1.620	.025	.067	.026
24	.264	.182	.529	.450	.274	.639	.184	.042	1.480	.023	.056	.031
25	.257	.174	.471	.400	.274	.550	.172	.041	1.260	.021	.046	.029
26	.246	.209	.419	.388	.240	.509	.155	.048	1.190	.020	.040	.030
27	.246	.843	.373	.373	.222	.550	.143	.735	1.090	.981	.032	.030
28	.240	1.780	.373	.373	.216	.571	.136	1.800	.968	.476	.031	.031
29	.240	2.100	.388	.358		.571	.124	.970	.490	.189	.033	.032
30	.255	1.970	.358	.331		.571	.112	1.020	.235	.120	.031	.032
31	.264		.331	.313		.593		.713		.075	.032	

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